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Civil Defense for National Security

A summary of the Report to the Secretary of Defense by the Office, Civil Defense Planning

SECRETARY of Defense James Forrestal has made public the report of the Office of Civil Defense Planning recommending a permanent peacetime program of civil defense which could be quickly expanded in the event of an emergency.

Terming the absence of any organization of the people to minimize the effects of possible enemy action "the missing link" in our defense structure, the planning agency set down the results of its more than six months survey to supply a comprehensive manual for guidance of states, communities, public and private organizations, and the entire civil population.

Because of the immensity of the problem and wide range of subject matter covered, Secretary Forrestal announced that he would withhold action on the report until receiving the comments of interested agencies of the government and others who have not had an opportunity to study its contents.

Russell J. Hopley of Omaha, Nebraska, who obtained leave from his position as president of the Northwestern Bell Telephone Company to serve as Director of the Office of Civil Defense Planning and deputy to the Secretary of Defense in civil defense matters, directed development of the plan in fulfillment of the terms of a directive issued in March 1948.

Defense Proposals

Basing its recommendations on the pooled thought of specialists drawn from essential fields of participation in an overall program, the Hopley group proposed:

A National Office of Civil Defense, with a small staff, to furnish leadership and guidance in organizing and training the people for civil defense tasks.

Basic operational responsibility to be placed in states and communities, but with mutual assistance plans and mobile supporting facilities for aid in emergencies.

Maximum utilization of volunteers, existing agencies and organizations, and all available skills and experiences.

Well organized and trained units in communities through the United States, its territories and possessions, prepared and equipped to meet the problems of enemy attack, and to be ready against any weapon that an enemy may use.

Intensive planning to meet the particular hazards of atomic or any other modern weapons of warfare.

A peacetime organization which could be used in natural disasters even though it may never have to be used for war.

In his letter of transmittal to Secretary Forrestal, Director Hopley commented:

"It is the purpose of this report to recommend for adoption a permanent peacetime system of civil defense which will round out our defense structure and which, in the event of an emergency, can be quickly and easily

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expanded to meet the exigencies of a given situation.

"In the event of a future war which might come to our shores, all of the people, all of the facilities, and all of the skills and energies of the nation must be utilized to the fullest extent. To successfully carry out this program will require the cooperation of every man, woman, and child in this nation. It is on such principles that civil defense must be erected and it must be with such a requirement that its organization be perfected.

"We hope that the Civil Defense Organization will never need to operate for war, but we dare not gamble on that hope. We who have studied the problem feel a great need for prompt action in establishing such an organization. To be without it leaves us in a most vulnerable position."

Legislation Reviewed

The report represents a summary of the over-all plan which requires federal, state, and municipal legislation for necessary implementation. It is pointed out that detailed technical supplements and training manuals, some of which are in the process of preparation, will be issued after passage of appropriate legislation, by Congress and the states.

Director Hopley said that the principle of state and local responsibilities under federal leadership has been reviewed in general with the Governors' Conference, the Council of State Governments, the American Municipal Association, the United States Conference of Mayors, and kindred groups. A resolution of the 1947 meeting of the Governors' Conference is quoted as follows:

"The establishment and the effective operation of an adequate civil defense program is an all important part of the first line of security for the nation and the states. The exigencies of the world today make such a program vi-

tally necessary. The Governors' Conference, therefore, pledges its support of a properly conceived civil defense program. The Conference wishes to emphasize—and experience during the last war has amply demonstrated—that efficient operation cannot be achieved unless the federal Government will work through and with the state governments."

Included in the report is a suggested model act for guidance of the states which has been prepared in accordance with the over-all concept of operational channels from the federal government to the state governments and from the states to their political subdivisions.

The approach in planning local and state organizations of civil defense is the same in that existing agencies common to most states, cities, and municipalities provide the framework. Only such agencies as are not ordinarily found in peacetime governments have been added. Councils of citizens to assist those directly charged with administration of civil defense are proposed at the state, city and local level.

Office of Civil Defense

In recommending that an Office of Civil Defense be established by Congress within the Executive Branch of the federal government, headed by "a director who should be a civilian of outstanding ability and qualification," the report further observes:

"There are but a few places within the Executive Branch where this office could be properly placed. The two most appropriate of these would be: One, reporting directly to the President; the other, reporting directly to the Secretary of Defense. Since a very large part of the civil defense program will require continuous coordination with all agencies responsible to the Secretary of Defense, it seems reasonable that the latter would be preferable.

"The Office of Civil Defense should

have representation on the Munitions Board and the Research and Development Board. This representation would expedite the integration of the civil defense plans with those of the Armed Forces."

Basic Principles

Throughout the report, which lists minute specifications for national, regional, state, community, and individual participation within some twenty-five separate chapters pertaining to operations and services, basic principles are reiterated having to do with the following:

Civil Defense Function: Civil defense for the future, as contrasted with civilian defense during World War II, is explained. The function is defined as mobilization, organization, and direction of the civilian populace and necessary supporting agencies to minimize the effects of enemy action directed against people, communities, industrial plants, and other installations—and to maintain or restore those facilities essential to civil life.

Peacetime Operations: A minimum organization is contemplated all along the line, ready to expand if the need arises.

Training: Necessity for training of certain technical and key workers in advance of an emergency has been recognized. Particularly is this urged in the field of radiological defense.

Self-Help: Those things that an individual can do to help himself, his family, his neighbors, have been set down as a fundamental concept. This same principle continues in suggested organizing effort by communities and industrial plants to protect their own people.

The entire report makes a realistic approach to the possible use of atomic and other "special weapons" by a hostile power

in a surprise attack on some densely populated area of the United States.

Radiological Defense

In language understandable to the layman, the chapter on "Radiological Defense" explains in considerable detail what can be done in the way of protective measures.

Detection and avoidance of radiological hazards is listed as the basic principle for all radiological defense operations within the civil defense program. The report points out that the presence of ionizing radiation can only be detected by means of special equipment operated by technically trained personnel.

It is proposed that area survey and technical services units be included in the local civil defense organizations consistent with training and operational plans promulgated by the national office working with and through the states.

The report points out that whereas other elements of civil defense currently exist in some degree, the requirements of radiological defense are peculiar in that no nucleus of organization now exists, and the source of personnel to receive training in conformity with that of the National Military Establishment probably would be largely teachers of physics and related sciences in the secondary schools, colleges and universities.

The report further observes:

"Education of the public in respect to the *true* potentials and *actual* limitations of atomic warfare is the only means by which the civil population may be adequately prepared to meet the eventualities of atomic attack. Prompt development and implementation of such an educational program is a major undertaking of vital importance to national security."

"No previous type of warfare has offered such rich opportunities to exploit fear of the unseen and the un-

known. It is, therefore, obvious that the primary objective of a program of education of the public in respect to atomic warfare should be to dispel the current unjustified fear of the radiological hazards involved in such warfare and to develop a wholesome understanding of and respect for the potentials of atomic weapons.

"All technical facts and figures which may be utilized must necessarily be concurred in by the Atomic Energy Commission, the Military Liaison Committee, the Armed Forces Special Weapons Project, and other governmental agencies directly concerned."

Chemical Defense

Possibility of the use of war gas by a future enemy is covered in the chapter dealing with chemical defense. The plan of action recommended in the Hopley report would be:

Immediate establishment of a chemical defense division in the Office of Civil Defense, qualified to proceed with the formulation of an organization which may readily be expanded for emergency use.

Training of individuals in knowledge of war gases, how to protect against them and first aid measures for gas casualties.

Such education of the public as is essential to assure awareness of potential danger and the steps required in the event of enemy attack.

Constant research in methods to protect against war gas attacks, and in the care and treatment of war gas casualties.

The report discusses "other special weapons" now known and expected with future scientific developments. It is proposed that the Office of Civil Defense include a special division which will collaborate with the Research and Develop-

ment Board, the Armed Forces, and other interested groups in developing appropriate defense measures.

Mutual Aid

Recognizing that an enemy attack utilizing conventional or unconventional weapons might come with such force that no state or community could count entirely on its own resources, the report urges a system of mutual aid and mobile reserves. Complete patterns of organization for mutual assistance are provided.

These proposals relate to arrangements whereby one city which has escaped attack would send trained forces to another stricken area. Similarly, it is recommended that key mobile reserve battalions be organized under state control with federal assistance and supervision. Such mutual aid agreements between neighboring communities and neighboring states would assure skilled crews of firemen, police, engineers, doctors, nurses, rescue workers and others.

Technical Services

In specifications for the many technical services required under the over-all program, attention is called to the vital role of the communications industry. Peacetime and emergency functions are listed for telephone, telegraph, radio in all of its forms, and other special systems.

Organization of air raid warning and aircraft observers in the Civil Defense Program to assist the Air Force in its responsibility for air defense of the nation is proposed.

Police and fire services are recognized among the essential elements of civil defense which are already organized for the protection of people and property. The report outlines expanded functions which must be planned in peacetime. Medical and health services are completely surveyed in the report and specifications listed for effective operation during a period of emergency.

The chapter on engineering services covers many subjects including provisions for blackout, dimout, camouflage, protective construction, shelters, city planning and sanitary engineering.

Problems of rescue are dealt with in a separate chapter. Organization patterns and techniques for emergency movement of large numbers of people will be found in three chapters headed: "Transportation," "Evacuation," and "Civilian War Aid." The latter deals with possible emergency clothing, feeding, sheltering and rehabilitation of the victims of a large-scale disaster.

Other chapters describe the functions and where applicable the federal, state, and local relationship of the following:

Plant Protection, Manpower Requirements, Supply System, Public Information, Control Centers, Incident Officers, and Civil Air Patrol.

Although Mr. Hopley anticipated his return to his regular civilian position, he will continue as special advisor and consultant and will be available for such appearances as may be needed. He announced that the advisory groups of leaders from many fields of participation in the plan will be disbanded.

Necessity for a continuing planning function is emphasized through the report in particular reference to the training of key workers, guidance for the states, and widespread public education.

Research and development is held to be a fundamental part of the civil defense program and should keep abreast of the

development of offensive weapons. In the special weapons chapter, the report says that special supplements will be issued from time to time as the capabilities of these weapons become more clearly defined.

In his letter to the governors of the states, transmitting the report to them for consideration, Mr. Hopley said:

"In conclusion, I want to emphasize that the report is still only the report of a planning group to the Secretary of Defense and that it cannot yet be taken as reflecting the position of the National Military Establishment or the executive branch of the government with respect to a civil defense program and organization. While my own planning group is naturally convinced of the soundness of its recommendations, it is obvious that a report which concerns the entire civilian population and is of interest to so many governmental agencies must be subjected to the most careful scrutiny and review before it can finally be approved. Mr. Forrestal is soliciting the views of all other interested federal agencies and of all major components of the National Military Establishment, and he would, I am sure, welcome any recommendations which you yourself might wish to make. When all these comments have been received and considered, the report in its present form, or as modified as a result of such considerations, will be referred to the President for approval and subsequent submission to the Congress."

Civil defense is essentially a civil function for which the military establishment is not adapted and to which, in an emergency demanding immediate retaliatory and counteroffensive measures, the services could not for long assign the necessary men or equipment.

General of the Army Dwight D. Eisenhower

The Women's Army Corps Becomes Permanent

Colonel Mary A. Hallaren, *General Staff Corps*
Director, Women's Army Corps

THE creation of the Women's Army Auxiliary Corps on 14 May 1942 was the result of a quarter of a century of progressive thinking by the War Department relative to its utilization of women in the services. In 1917 a group of civilian women had served with the American Expeditionary Forces in France. Problems arose relative to the supply, billeting, welfare and discipline of American civilians serving overseas with the Army. From 1917 to 1942, the subject of a Women's Corps was periodically revived, studied and filed, within the War Department. It was not until World War II, when it became evident that there was going to be a shortage of manpower, that the idea took root. The thought blossomed quickly, not only because the Army wanted to avoid the problems of World War I, but also because many of the skills and techniques needed by the Army were possessed mainly by women. To train men in typing, telephone operating, etc., would be wasting time, money and manpower when trained women were available from civilian life.

Within two months after the passage of the bill, basic training and an officer candidate school for women opened at the First WAAC Training Center, Fort Des Moines, Iowa.

In the early days of the Corps, only four types of jobs were contemplated for Waacs—clerical work, motor transport,

cooking and Aircraft Warning Service. Two years later, the Corps had extended its scope to include over 200 different non-combatant jobs. They performed practically every type of task except actual combat and served in more than 400 installations in this country and in all theaters of operation.

Women's Army Corps, AUS

But the WAAC had its problems. Questions arose concerning command channels, discipline, benefits—Army and WAAC. It took less than a year to prove that a corps of women working in the Army rather than *with* the Army could better reach its full effectiveness, and on 1 July 1943, the President signed Public Law 110, 78th Congress, which established the Women's Army Corps, and made it a part of the Army of the United States. This was an important change inasmuch as full military status was now given its members.

Waacs were given specialized training at the Motor Transport School, Cooks and Bakers, and the Administration School. They attended many other Army schools, including Army Finance, Photo Lab Technician School, Armored Parts Clerical Course, the Investigators' School at the Military Police Training Center, the Ordnance Parts Clerical School (training in battlefield identification of field artillery and motor parts), Signal Corps School, Engineers School (training as draftsmen), etc.

WAC officers attended the Inspector

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General's School, The Adjutant General's School, School for Special Services, School of Military Psychiatry, Allied Military Government School, Finance, Quartermaster General, Chemical Corps, and the Command and General Staff School. A number attended the Auxiliary Territorial Service Wing of the British Staff College to train for staff work with the two Allied services.

Overseas Service

The first contingent of enlisted women and their officers ever to serve outside the continental limits of the United States landed in Algiers, North Africa, on 27 January 1943. Wacs arrived in the Pacific Theater on 28 January 1944, at New Caledonia.

Nearly 18 per cent of the Army's peak of 100,000 Wacs served overseas in Ber-

stenographers and aides at the war crimes trials in Germany and in Manila.

The Demobilization Period

Demobilization for the Women's Army Corps was conducted on a scale proportionate and consistent with the Army policy. Overseas shipments and all enlistments in the WAC were discontinued after the news of the capitulation of Japan. From Caserta, as early as June 1945, came the first redeployed Wacs by air, veterans of twenty-nine months in North Africa and Italy, and by 1946 the last Wacs had departed for home from the Philippines. The final Officer Candidate Class at Fort Des Moines, the 60th, was commissioned in November 1945, and the training center at Fort Des Moines then became one of the separation centers for

Establishment of the Women's Army Corps as a part of the permanent military establishment is a tribute to the record of the Corps in World War II, and to the need of women by the services in the future

Mudra, Scotland, Germany, England, France, Egypt, India, China, Ceylon, New Guinea, Australia, Hawaii, Labrador, British Columbia and Yukon Territory, Leyte and Luzon in the Philippines, Japan and Korea. Over 8,000 were serving in the European Theater on VE-day. At the same time there were approximately 6,600 in the Pacific Theater.

Wacs were present at many of the historic moments of the war. Twenty-seven of them operated the switchboard at the Potsdam Conference, 432 worked on the atomic bomb project; others were present at the meetings of the Big Three at Yalta, in Canada, at Potsdam, at the German surrender at Rheims, and at the Japanese surrender at Baguio, Philippine Islands. Among the unusual jobs held by Wacs was the administration of 500 German women prisoners in the prisoner of war camp at Chartres. Others served as legal

women. Many women took advantage of the opportunity offered both in this country and overseas to accept discharge and continue on the same job in civilian status. At the same time effort was concentrated on the assignment of low-point women to separation centers to assist with the tremendous clerical task of demobilization.

However, when the shortage of skilled personnel in the Army hospitals, separation centers and headquarter installations became critical in 1945, the Army decided actively to encourage enlisted women with critically needed skills to remain in the service beyond their date of eligibility for separation. To supplement the voluntary-retention program, a reentry program was established whereby honorably discharged enlisted women with skills urgently sought by the Army could return to the service for the duration plus six months.

Proud Wartime Record

Measured by its record and by the performances of its members, the WAC was accepted by the Army and the public as a working element of the great Army team, and accomplished its mission "to make available to the Army the knowledge, skill and special training of the women of the nation."

Wacs have seen the destruction of war—they know the rubble, the debris, the poverty, the blackened walls, the shredded concrete, the crazily leaning steel, the

for the people of their own country. They have developed a keen appreciation of what the American standard of living means.

Army life has drawn a great deal on the resourcefulness of women. The American woman's ingenuity has applied in organizing offices, in utilizing obsolete office equipment, and in making "home" out on a tin-roofed or palm-thatched hut. The Army has taught her the recognition and willingness to carry the responsibilities of active leadership in the world of today.



Two recruits for the new Regular Army WAC (left) report at the WAC Training Center at Camp Lee. After completion of 8 weeks training, a WAC recruit receives a certificate (right).—US Army photos.

gaping chasm where once bridges arched. Everywhere they have served they have learned to know the people with whom they have worked, or among whom they have lived. They have met and talked to the English, the Dutch, the French, the Belgians, the Germans, the Filipinos, the Chinese, the Japanese, the native islanders of New Guinea. They have found that the problems of living are essentially the same the world over. They have gained not only a respect for the people of other countries, but a deeper respect

To Regular Status

It is a matter of great interest and pride to the women in the Corps who enlisted during the emergency, with little thought of service beyond its duration, to learn that the active participation of women in the war proved so sound and so important to the conduct of its mission that the Army, in carrying out its responsibilities of maintaining peace and safeguarding the national security, sought and obtained legislation to provide for the continuance of the women's service

in its postwar military establishment. In building and maintaining a force ready for any future emergency, those in the Army were convinced conclusively of the desirability and necessity of continued

of women by the Armed Services in the future. For the military has discovered what business and industry have long known—that the efficiency of any organization may be improved by the utilization



Trainees at the WAC Training Center, Camp Lee, leaving an outdoor class in military etiquette and customs of the service, a part of their basic training course.—US Army photo.

utilization of women in the interim and peacetime armies.

The establishment of the Women's Army Corps as a part of the permanent military establishment has given recognition to the contribution of women in the Armed Services in World War II, and to the need

of women in assignments for which their aptitudes and skills particularly qualify them—in peace or in war.

Public Law 625, "The Women's Armed Services Integration Act of 1948" which, on 12 June, established the permanent Women's Army Corps, has specified the

number of women who may serve as members of the Women's Army Corps at 2 per cent of the Regular Army strength. This small group will form the nucleus upon which the Corps will expand in case of a national emergency. It necessitates the establishment of a policy of quality, not quantity, as the keynote of the Women's Army Corps selection and enlistment program—and emphasizes that there can be no compromise in the high caliber either of the officer or the enlisted personnel.

Qualifying for Enlistment

Every woman must meet the higher, peacetime requirements—the standards of

completed honorable active WAC service since 1 July 1943. An enlisted woman presently on duty, whose application is approved by both her company commander and section chief, may apply for a waiver if she is over age.

Women without prior military service must possess a certificate of graduation from high school; or hold a state-recognized equivalent. Women who have been honorably discharged from the service or who are presently on duty are not subject to the above education requirement.

Officer Integration

The officer selection program parallels



Education and recreation are an important part of Regular Army WAC life. Two recruits examine a USAFI education poster (left). A social gathering at the Camp Lee Service Club (right).—US Army photos.

character, health and education—to qualify for membership in the organization. For those who do measure up, the WAC now offers an opportunity for a career in the Regular Army.

Age requirements vary with service. Women between the ages of 18 and 35 years are eligible to apply for enlistment. Women who have had prior military service are eligible providing their age does not exceed 35 plus the number of years of

that conducted for the men of the Army, and application has been open to all WAC officers on active duty and all former WAC officers. This application period closed on 31 August 1948. The law which was passed on 12 June 1948 establishes a limit of 500 WAC officers to be selected during the first two years. Appointments will be made in four groups, the first to consist of 40 per cent of the total allowed, or 200 officers, with three increments of 100 officers

being added over intervals of approximately six months each. To the bystander this may seem to cover an excessive amount of time, but there is a purpose in maintaining this pace. Slow, steady progress is additional insurance that only the most highly qualified women will be admitted to the Corps.

Training

Training is an important phase of the program. With the standards of selection set at a high level, the training must measure up to the same criteria. Eight weeks of basic training are required for the recruit, during which time the trainee will receive her indoctrination into military life. She will be checked to determine her potentialities and aptitudes. By the time the recruit has assimilated the basic elements of military knowledge, she will be ready to enter the first phase of specialist training—to take her first step towards a military career.

An important consideration in the selection of a career is the possibility for advancement within a chosen field. With this thought in mind, plans are being formulated for the inclusion of women in the Army's Career Management Program. Under the provisions of this plan, the Career Planning Branch has mapped out the progression of military personnel from enlisted apprenticeship to supervisory status in the warrant officer grades. It is planned that no woman will be assigned to any field of work until it has been definitely determined that the possibility for progression to the highest grade will be possible.

Great stress is also being laid on the training of noncommissioned officers. Capable young women who appear to have potentialities for advancement as cadre are selected to receive leadership training, to prepare them for assignment as noncommissioned officers. The planned courses ad-

ministered in the Leaders School contemplated for the Women's Army Corps are in many respects patterned after the Officer Candidate School.

Officer Training

Enlisted women who meet the eligibility requirements have the opportunity to attain commissioned status. In addition, qualified women may now apply for Officer Candidate School directly from civilian life, and if selected will be sent to basic training immediately prior to attendance at the six months Officer Candidate Course.

Distinguished graduates of OCS may be commissioned directly into the Regular Army. Others will be given reserve commissions, and may enter on a one year competitive tour. Upon successful completion of this tour of duty, such Reserve Officers may be appointed in the Regular Army.

Peacetime Assignments

At the present time a hiatus has been reached in the assignment program. While the potentialities of women in the military were tested during the recent war, the experiment is far from complete. WAC enlisted personnel performed 239 types of military jobs during the war. Classification experts have found that there are actually 406 non-combatant Army jobs which can be performed efficiently by women. The war provided little time for research in the field of classification and assignment. Peacetime must make up that deficit.

The WAC Looks Ahead

The permanent Women's Army Corps is writing a new page in the history of the Army, and a new chapter in the story of women through the ages, for—as a Congressman stated when the legislation passed—women have “become an integral part of the armed forces of the United States in peacetime for the first time in history.”

The Airborne Conquest of Crete

Lieutenant Colonel C. T. Schmidt, *Infantry*
Instructor, Command and General Staff College

THE German conquest of Crete in May 1941 remains the sole instance of a major operation carried out, from beginning to end, by airborne means. A large ground combat force was transported by air to a distant island. There it attacked and destroyed a numerous garrison. The attacker was supported tactically and administratively by powerful air forces; the defender was virtually without air support. On the other hand, the defender had naval superiority, which he used to shatter a seaborne expedition against the island. But the attacking air force, in turn, routed the defending navy, thereby insuring the isolation and capture of the island.

Certain features of the situation at Crete were perhaps singular, but not necessarily unique. A similar set of conditions might well reappear. It is therefore of more than passing interest to recount the nature of that campaign and to recall some of its lessons.

The Strategic Setting

Early in March 1941, the British sent some 60,000 troops into Greece in a vain effort to support their Balkan allies against an impending German invasion. During April, the Germans defeated the Greeks and the British and overran the mainland

of Greece. The British evacuated a part of their expeditionary force to Crete, together with small remnants of the Greek army.

To the Germans, the seizure of Crete at this point promised several marked advantages. It would deprive the British of air bases from which they could attack the Rumanian oil fields. German planes on Crete could protect German and Italian ships plying Greek waters while seriously restricting the movement of the British fleet in the eastern Mediterranean. German planes on the island could attack Alexandria, Cairo, and the Suez Canal (see Map 1). A German conquest of Crete would also impress the Turks, as well as other peoples of the Near East and serve to shut the doorway to the Dardanelles and the Black Sea ports of Russia.

There is evidence that about mid-April 1941 Hitler approved a master plan for operations in the eastern Mediterranean. Seizure of Crete was to be the first goal of these operations. Cyprus was to be taken next; thereafter, the Germans would be in a position to launch an airborne attack on the Suez Canal.

Topography of Crete

The island of Crete lies in the eastern

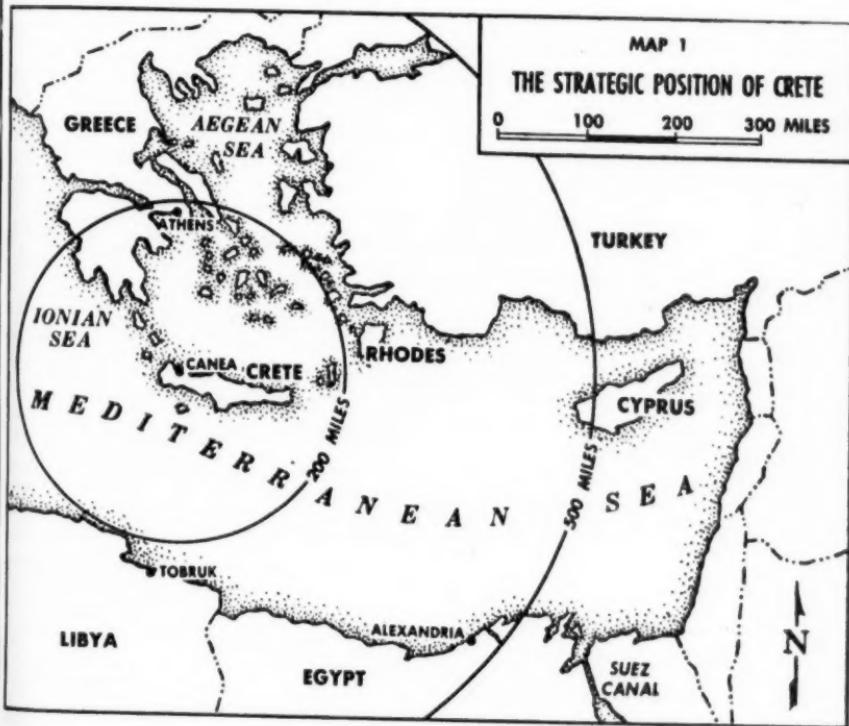
The famed airborne conquest of Crete was skillfully coordinated and boldly executed, and the lack of British air support spelled doom for the island, but the cost of victory shocked the German high command

Mediterranean, athwart the entrance to the Aegean Sea. It is about 180 miles from Athens, and 340 miles from Alexandria. Some 165 miles long, its width ranges between 8 and 35 miles (see Map 2).

Most of the island is mountainous; only an eighth of its area may be described as lowland. An irregular mountain chain

stretches of open coast lie along the heads of the large bays of the north.

The climate is typical of the Mediterranean area. The winters are mild and rainy and the summers are hot and dry. The inexperienced visitor may have difficulty in finding drinking water in the mountains during the summer.



extends along Crete's east-west axis. Toward the west, the peaks rise to elevations of 8,000 feet. The upper slopes of the mountains are bare; the lower slopes are sparsely clad with trees and shrubs. Most of the lowland area is on the northern side of the island. There are no large rivers. The coastline is generally steep and inaccessible; however, considerable

The road net suitable for military traffic is very simple. There is one narrow, paved highway paralleling the northern side of the island. It connects the main towns. A few branch roads cross the mountains from north to south. There is no road at all along the south coast.

The Cretans are largely engaged in agriculture, particularly olive culture and

herding. There is little industry. Most of the population of 400,000 live on the northern coastal plain, and it is there that the three main towns of Crete—Canea, the capital, Retimo, and Heraklion—are located. Each of these towns is a minor port. A few miles east of Canea is Suda Bay, the best harbor in Crete and one of the finest in the Mediterranean.

The Defenders of Crete

By the beginning of May 1941, British air power in the eastern Mediterranean was extremely weak. Only forty-three fighters and ninety bombers were operational in Egypt and Crete. Because of the limited range of the fighter aircraft, support for Crete from planes based in Egypt could hardly be effective. Crete is small and rugged, and its potential landing areas are not numerous. The three operational fields used by the RAF were very exposed, and the planes based on them could not survive a major attack.

Despite the obvious difficulties imposed by the lack of adequate air support, the British high command decided that there was no choice but to defend Crete. The island had great strategic value that should be denied the Germans. It was hoped that an attack could be repelled despite the weakness of the RAF.

The situation of the Cretan garrison was certainly unpromising, but it was not as bad as German intelligence surmised. A summary given to the attacking troops on the eve of their jump-off declared that the British troops on Crete numbered about 5,000, and that they had *not* been reinforced by troops evacuated from Greece. The estimate was that the defense of Crete consisted of "three battalions of infantry, thirty light tanks, thirty AA guns, forty AA machine guns, and nine coast defense guns."

Actually, the British and Imperial forces at that moment consisted of about 27,500 troops. They comprised: (1) the garrison established on Crete in November

1940, namely, 3,500 men of the 14th Infantry Brigade, with attached artillery and naval units; (2) some 14,000 troops recently evacuated from Greece, consisting of a depleted New Zealand infantry division, six British and five Australian infantry battalions, and some supporting tanks and artillery; (3) around 10,000 British, Cypriot, and Palestinian service troops and casualties, also evacuated from Greece. In addition, there were about 14,000 Greek soldiers, organized in eleven infantry battalions.

The original British garrison and the infantry brought back from Greece had at least their small arms, and they were seasoned soldiers. They were weary but in good spirit. The miscellany of casualties and the Greeks, however, were of doubtful value. The Greek battalions were largely filled with badly equipped recruits.

Most of the heavier equipment of the evacuees had been lost in the escape from Greece, and the weapons in the hands of the troops were a mixed lot. There were forty-nine pieces of captured Italian artillery, some without fire control instruments, and only a few hundred rounds of ammunition for each one. There were also ten 3.7-inch guns, fourteen 3-inch AA guns, thirty-four Bofors guns, a few AA machine guns, and twenty-four 36-inch searchlights. Eight infantry (medium) tanks and sixteen light tanks were available, as well as a few armored troop carriers. Steel and concrete for defensive positions were not available. Excavating equipment and transportation were scarce. There was a serious shortage of clothing and bedding. The forces required 600 tons of supplies a day, but German air attacks permitted only a fraction of this tonnage to be delivered to the troops. Consequently, heavy inroads were made in reserve stocks.

During the half-year before the attack, there were five commanders of the British forces on the island. This was probably responsible for some confusion as

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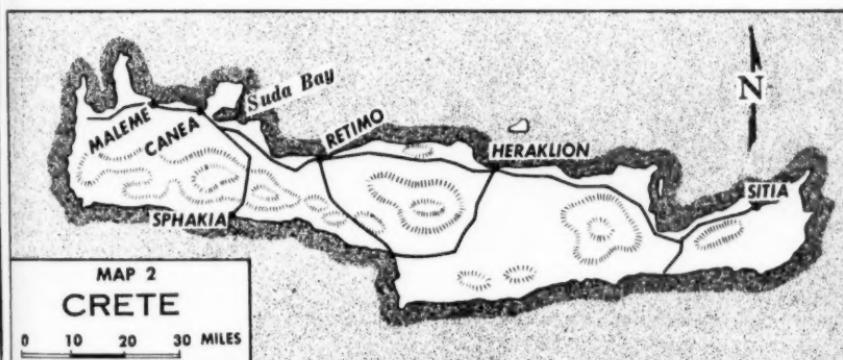
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to how the defense should be planned. Not a great deal could be done to strengthen Crete, and even less was accomplished.

The lack of roads and vehicles, and the exposed and dispersed location of air fields and beaches, certainly complicated the problems of defensive organization. However, there were only three air fields; it was therefore possible to organize perimeter defenses around each of them.

At the end of April command of the motley British-Greek army was given to Major General Bernard Freyberg. A New Zealander, Freyberg was the hero of many daring exploits in World War I. He had

tanks attached, and three Greek battalions, were assigned to the Maleme air field sector. Naval base troops, a battalion of British marines, three British infantry battalions, and two Greek battalions were at Suda Bay. Four Australian and three Greek battalions, with two tanks, were assigned to Retimo; and a British infantry brigade and one Australian and three Greek battalions, plus eight tanks, undertook to defend Heraklion. Three British battalions were held in reserve. Most of the antiaircraft guns were sited around Suda Bay. One partially completed air field (at Kastelli, west of Maleme) was



commanded the New Zealand troops in Greece. By the time of his assignment to Crete, British intelligence admitted that a major airborne attack was imminent. Freyberg pointed out that his force was ill prepared to meet such a blow. He would fight, but he gave no hope of success.

General Freyberg disposed his troops with a view to denying the three air fields to the enemy and protecting Suda Bay (his supply base) and adjacent beaches. Four self-contained defense groups were organized, one each at Maleme, Suda Bay, Retimo, and Heraklion (see Map 2). Island headquarters were established at Canaea. The New Zealand division, with twelve

obstructed and abandoned because there were no troops to protect it.

During the night of 24-25 May, after the battle had begun, two Commando battalions arrived from Egypt at Suda Bay. They were to have reinforced the defenders of Maleme; they came too late for any role but that of assisting in the evacuation of Crete.

The German Plan

For the capture of Crete, an air-army task force was organized. The commander in chief was an air force officer, Colonel General Loehr. *Fliegerkorps VIII*, under General Richthofen, was to provide the necessary air support. It is estimated that

about 300 medium bombers, 150 dive-bombers, and 300 fighters were available for the attack. *Fliegerkorps XI*, commanded by General Student, was to be the airborne striking force. An air force pilot during World War I, Student was one of the pioneers in the development of airborne techniques in Germany. Ten air transport groups, comprising about 530 *JU-52* troop carrier planes and fifty-three gliders, were allotted to the operation.

Combat troops available for the invasion consisted of the 7th Airborne Division with one parachute and glider assault regiment attached (about 15,000 men), and the 5th Mountain Division (air transportable). Later, one infantry regiment of the 6th Mountain Division was given to Student. The mountain troops were chosen because of the adaptability of their weapons to air transport. The 5th Division had fought through the Balkan campaign; its strength was down to 10,000 men. In all, the airborne force totalled about 25,000 troops.

A seaborne force of some 5,000 troops, including one battalion of the mountain division, twenty-five tanks, AA and anti-tank guns, and field artillery, was to be transported in thirty small ships. This flotilla, under command of Admiral Schuster, was to reach the shore near Maleme before the end of the second day of the assault. It is said that the seaborne force was included at the insistence of Hitler. As we shall see, it had no effect upon the outcome of the battle.

The parachute and glider troops, together with their special equipment, were transferred from Germany to Greece in late April and early May. The mountain troops, already in Greece, were given about ten days of training in airborne techniques.

The tactical plan required that the 7th Airborne Division, with the attached assault regiment, drop at four widely separated places on D-day. At H-hour, half of the 1st Battalion, Assault Regiment, was

to land in twenty-nine gliders at Maleme air field, knock out AA weapons, and cover the descent of the parachutists (see Map 3). The priority of glider landings at Crete is in opposition to current United States doctrine. The Germans may have decided to land gliders first, despite the presumably greater risks of such a procedure, in order to attain greater surprise. Also, at that time their glider landings were more accurate than their parachute drops. The 2d and 3d Battalions were to parachute at H plus 15 minutes on Maleme and capture the field. The other half of the 1st Battalion, in twenty-four gliders, was to land near Canea, ten miles east of Maleme, and destroy the AA batteries there. The 3d Parachute Regiment would also drop near Canea and take Suda Bay. At H plus 8 hours, elements of the 2d Parachute Regiment were to take the town and air field of Retimo (thirty-eight airline miles east of Maleme). At the same time, the 1st Parachute Regiment was to capture Heraklion town and air field, seventy-three airline miles east of Maleme. All four groups were to make contact with one another promptly. As soon as the landing fields were taken, presumably late on D-day, the mountain division would be flown in by transport planes, and the island would be cleared and occupied. As noted, the seaborne elements were to land near Maleme before the end of D plus 1. H-hour was set at 0800 20 May.

Plans for airborne supply were based on requirements for ten days of combat. Ammunition and weapons replacement supplies were estimated to require at least 150 tons daily. Selected motor maintenance men and drivers were trained to repair and drive captured vehicles. These men were to be dropped by parachute. Because of the expected water shortage, 25,000 bottles of water were to be dropped daily. Heavy equipment was to come by sea.

The German plan confidently expected the fall of the three air fields on the

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first day. This assurance was undoubtedly based on a serious underestimate of the British defenses. However, both the plan and the means available were sufficiently flexible to permit quick adjustment to an upset in the time schedule. The essence of the plan was the seizure of one or more landing grounds, so that reinforcements could be brought in promptly to overwhelm the defenders. In view of German dominance in the air, it could make little difference in the ultimate outcome of the battle whether one or two or three fields were taken. Control of but one landing ground would be enough.

The Air Battle

During the first two weeks of May, German bombers mainly attacked shipping in Cretan waters. On 13 May the battle for control of the air over Crete began. The German objective was to neutralize the RAF on the island, or to drive it back to Egypt; to uncover and destroy ground defenses of the Cretan air fields; to shake the morale of the defending troops; and to make Suda Bay useless to the Royal Navy. The *Luftwaffe*, overwhelmingly strong, soon won the battle. By 19 May only six effective RAF fighters remained on Crete. To avoid their destruction, they were flown back to Egypt on that day. Thus, there was not a British plane on Crete when the airborne assault began.

Suda Bay was made well-nigh untenable for the British. The landing of supplies on the island became extremely difficult, even when unloading was confined to darkness. Many supply ships were unable to reach Crete; a large part of the supplies unloaded was destroyed on the docks.

A few days before D-day the air attacks on British defenses, particularly on the artillery emplacements, were intensified. This drew forth antiaircraft fire and permitted the plotting of gun positions. Furthermore, the heavy bombing and strafing continually drove the gun crews

underground and put a severe strain on them.

Throughout the subsequent land battle the *Luftwaffe* transported, supplied, and reinforced the troops on the ground, silenced the defender's artillery, interrupted his communications, and immobilized him during daylight.

Winning the Airhead

Beginning at 0600 on 20 May waves of fighters and dive bombers attacked Maleme, Canea, and Suda Bay, paying special attention to the British AA guns and the roads between Maleme and Suda Bay. At 0800 the gliders descended near Maleme air field and Canea. There were errors in the approach of some of the gliders, and a few were destroyed. But for the most part, the glider landings seem to have been accurate. Some of them landed behind the screen of dust thrown up by the air attack, while the defenders were still in their slit trenches and dugouts. The paratroopers dropped more or less in accordance with schedule, and fairly accurately. Those who landed south and east of the air field and near Canea ran into very stubborn defenses. Many were killed or wounded before they could collect their weapons and organize; survivors did succeed in disrupting communications and distracting the defenders.

The gliders and parachutists dropped on the west side of Maleme were more successful. In fact, they were the nucleus of the forces that eventually would take Crete. Their appearance apparently was a surprise to the defenders. Covered by their supporting glider troops, who had landed in a dry river bed just west of the air field, the paratroopers organized quickly and attacked the New Zealand battalion on the western portion of the field (see Map 3). By nightfall of D-day they held the field. With that, the Germans had won a precarious toehold on Crete.

The attacks on Retimo and Heraklion were off schedule. The transport planes,

which had been over Maleme earlier in the day, were delayed in refuelling. Their return trip to Crete was therefore too late to coordinate with the supporting fighters and bombers. In consequence, the paratroopers dropped on extremely heavy British fire. They were unable to capture either the town or the air field. However, isolated units held out near the field. At Heraklion, the attacking troops suffered severe casualties from the tanks and small arms of the defenders. They were driven from the air field and their attack on the town failed.

Thus, resistance everywhere was much stronger than had been expected. The groups dropped at Canea, Retimo, and Heraklion had failed to accomplish their missions. But at least they pinned down and isolated British forces that might, if free, have turned the tide at Maleme. It is interesting to note that the garrison of Heraklion knew nothing of the airborne attacks on other parts of the island until noon on 21 May when it heard a news broadcast from London.

At the end of D-day, General Student (still at his headquarters in Greece) decided to throw all available troops into Maleme. Here was the critical point of the battle. Everything hinged on converting the hard-won lodgment into a secure air-head. Student was given a regiment of the 6th Mountain Division to reinforce the 5th Division. The transport planes, loaded with mountain infantry, took off from their Greek bases on the morning of D plus 1. The air field was still under artillery fire; indeed, fighting was going on for its possession. But the pilots were ordered to land and discharge their loads, even if they had to do so under fire. As the planes landed, some were hit and many crashed in shell-holes. But they came on, they landed, and they disgorged their troops.

An Australian observer described the scene: "No man but a madman would obey

an order to pilot an aircraft on to that steel-raked field . . . Then the thing that couldn't occurred. One of the troop carriers touched down, rolled to a stop, unloaded its men and their equipment, lifted, and flew off again. It was down and away within seventy seconds. More troop carriers still streamed in from the Aegean. It seemed endless. And presently a second plane made a landing and got away, then a third, then a fourth. More and more. Madness was succeeding . . ."

By dark of D plus 1, three battalions of mountain troops had been delivered at Maleme. During the next days, despite repeated British artillery fire and infantry counterattacks, a steady flow of reinforcements continued to pour in. On D plus 2, General Ringel, commander of the Mountain Division, organized an attack on the British positions still able to fire on the air field. A wedge was driven between the New Zealanders near Maleme and those at Canea; a projected British counterattack had to be abandoned. At the end of that day the field was securely in German hands. The outcome of the battle was now evident.

The Naval-Air Battle

The German seaborne force, which was to have landed late on D plus 1, was intercepted during the night of 21-22 May by British destroyers in the Aegean. Roughly, 40 per cent of the vessels were sunk, and about 1,000 men drowned. The rest of the flotilla was dispersed, and surviving craft returned to Greece. Not until the Battle on Crete was decided did seaborne reinforcements, including a few tanks, get through.

On the morning of 22 May the *Luftwaffe* picked up the British battle fleet in Cretan waters. The Germans attacked vigorously and in great strength. In the ensuing fight, the British force was driven out of the

* John Hetherington, *Airborne Invasion*, Duell, Sloon, and Pearce, 1943.

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Aegean at heavy loss to itself. Two cruisers and four destroyers were sunk, and the surviving ships severely damaged. The Royal Navy could no longer render effective support to the garrison on Crete.

the inevitable decision to evacuate the island, and the mopping up by the victors.

On D plus 4 Ringel's mountain troops broke through the British lines east of Maleme and linked up with the Germans out-



Breakout and Occupation

The remainder of the Crete campaign is simply the story of increasing pressure by the Germans with the defenders pushed farther and farther back from the airhead, the capture of the British supply base,

side Canea. A coordinated air-ground attack on Suda Bay and Canea resulted in their capture late on D plus 7 (see Map 3).

A force was now sent to relieve the paratroopers still hanging on at Retimo. The British garrison there—out of touch

with the rest of the island and confronted by overwhelming German strength—surrendered on 29 May. The Germans outside Heraklion had improved their situation considerably after being reinforced by parachute troops on D plus 2. On the following day they managed to encircle the British land lines. Five days later reinforcements were dropped, and preparations were made for a decisive assault on Heraklion. However, during the night of 28-29 May the British garrison was taken aboard naval vessels and evacuated to Egypt. A few hours later, the Germans marched into the town.

Meanwhile, the British positions south and east of Canea had become indefensible. On 27 May General Freyberg decided to withdraw across the island to Sphakia, and there to evacuate as many of the troops as possible. The retreat over the mountains began (see Map 3). Elements of the 5th Mountain Division followed, and heavy fighting took place between them and the British rear guard. Harassed by air attacks and the pursuing troops, the British were nevertheless able to embark nearly 15,000 troops during the nights of 28 May-1 June. Unfortunately, many of the men who had borne the brunt of the fighting had to be left behind. The evacuating ships were pursued and attacked during most of their way back to Alexandria.

Towards the end of the operation a small Italian combat force was transported from Rhodes to Crete. These troops landed without opposition at Sitia Bay, at the east end of Crete, on 27 May. They had little difficulty in moving westward—in fact, their part in the campaign was of no significance.

By 2 June Crete had been cleared of British troops.

The Cost

The German losses in the Cretan operation were heavy. Some 4,000 troops were killed—this includes about 1,000 drowned in the Aegean—and approximately 8,000

were wounded. Transport planes lost, mainly in crash landings, numbered 170 out of the 530 employed. The big casualties of the Germans might be largely attributed to poor intelligence. It should be borne in mind, too, that one-fourth of their losses were suffered in an amphibious movement that contributed nothing decisive to the campaign. The fact remains that the mission, the capture of an important strategic objective, was accomplished.

If German losses were high, those of the British were even higher. Approximately 14,850 troops were evacuated. This means that at least 14,000 were left behind, either dead or as prisoners. Also, the bulk of the 14,000 Greek troops were lost. The Royal Navy suffered heavily, too, both in personnel and in vessels destroyed and damaged. About 75 per cent of the immediate effectiveness of the Mediterranean fleet was lost in the Cretan operation.

Retrospects

To the world at large it looked as if the Germans had paid little for such a prize as Crete, and the defeat of its garrison and the Royal Navy. But to the German high command—at least to Hitler—the cost seemed high.

In view of the spectacular vindication at Crete of a new mode of warfare, it may appear surprising that the Germans did not again employ airborne techniques on a large scale. This was not the fault of Student and other German airborne pioneers. There is evidence that the high price of the victory was something of a shock to Hitler. In the spring of 1941 he was not yet used to the decimation of the German arms that was to come later. At any rate, after Crete he evinced a prejudice against airborne warfare, arguing that it had lost its initial advantage of surprise. Furthermore, there seems to have been a decided lack of interest

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in airborne operations within influential army circles. In part, this may have been because the parachute troops "belonged" to the air force rather than to the army.

Certainly the conduct of the Crete operation was bold, especially in the reinforcement of initial success. It also demonstrated great skill in the coordination of varied arms and new techniques. Once the battle was joined, the enemy was given no respite, even when the attacking force was well-nigh spent. Evidently the operation was carefully planned, particularly as regards cooperation between air and ground elements. For instance, the prompt and effective fire support given by combat aviation to the infantry rested largely on the ability of the ground troops to communicate their needs quickly to the pilots overhead.

The campaign showed conclusively that airborne troops are able to carry on sustained action against an organized opposition, on the basis of tactical and administrative support delivered by aerial means.

As for the British side of the battle, little can be said beyond the obvious: The lack of air support spelled doom.

After the withdrawal of the Cretan-based planes, the RAF did operate over Crete and mainland Greece. But these attacks were on a small scale, because of the shortage of aircraft and the limited range of the current fighters. They had no influence on the ground fighting.

It is an understatement to say that the defeat of a large-scale airborne attack is difficult unless the defense has adequate air support. But it is more than difficult if the defense is also immobile and fragmented. The chief lesson of Crete is that a mobile counterattack force, including armor, artillery, and combat aviation, is essential to repel such an attack. This is precisely what the British did not have. It is therefore hard to see how they

could have avoided losing Crete, sooner or later. And yet, in the perspective of hindsight, it would seem that more might have been done to make victory costlier for the attacker.

There is no evidence that the air fields of Crete were systematically obstructed or mined. But one of the first duties of parachute troops is to clear landing areas for their transport planes. Obstructions to prevent such landings—especially on air fields—should be available for installation, and they should be hard for enemy troops to remove. Obviously, they must be covered by fire. As a final measure, mines should be detonated to destroy the air field and potential landing areas in its vicinity.

The British signal communications were cut almost as soon as the battle began. But an adequate communications system is essential for the coordination of the defense against airborne attack. Telephone cable to connect the various defense installations should be concealed underground in order to prevent damage or destruction.

It must be expected that all apparent defensive works will be bombed before a landing is made. This should be taken into account in siting, construction, and camouflage of weapon emplacements. Certain weapons might well remain silent until the landing begins. The air field defenses on Crete seem to have been limited to a single perimeter around each field. This is not enough. Mutually supporting fires must cover not only the field itself but also the approaches outside the field. That is, both inward and outward perimeter defense is necessary.

Certainly the British and Imperial troops at Crete fought against heavy odds with courage and tenacity. But for that, so many could not have been rescued. Yet valor's reward is greater when it is backed by the big battalions.

MATS

Headquarters Organization

A Staff Tailored to a Particular Mission

Colonel Robert E. Cron, Jr., *Corps of Engineers*
Vice Deputy Commander, Services, MATS

A WORKABLE staff organization must exist as a condition precedent to efficient command. In a small unit the principles of good staff work can exist in the well-organized mind of a commander. But commanders have limited spans of control. Large units require well organized and smooth functioning staffs. A recent article in the *MILITARY REVIEW* ("Variations in Staff Organization," August, 1948) summarizes various forms of staff organizations and points out the desirability of uniformity in echelons of command, but also recognizes the necessity for variations in organization to fit special cases. Headquarters, Military Air Transport Service (MATS) is an excellent example of a staff specially tailored to a particular mission, the supervision of an intricate world-girdling command structure.

Frequently not comprehended is the fact that MATS' air transport element, composed of Air Force and Navy resources, with a sprinkling of Army here and there, performs only a part of the MATS mission. Included also within its responsibilities are the operation of bases of national interest, and the supervision of four technical services of the Air Force

which support, within their fields, not only the entire Air Force but also the Army and Navy in varying degrees. The headquarters of those services are located with Headquarters, MATS, and form a part of it. Yet the integrity of Airways and Air Communications Service, Air Weather Service, Air Rescue Service, and Flight Service has been maintained as commands. Headquarters of the services function as special staff sections of MATS headquarters, within their respective fields of activities, and at the same time are true command headquarters over their own subordinate units. The technical services of large field units, such as Corps and Army, can well function in like manner, as vertical commands, with the command headquarters of each service acting in the added capacity of a special staff section in Corps or Army headquarters.

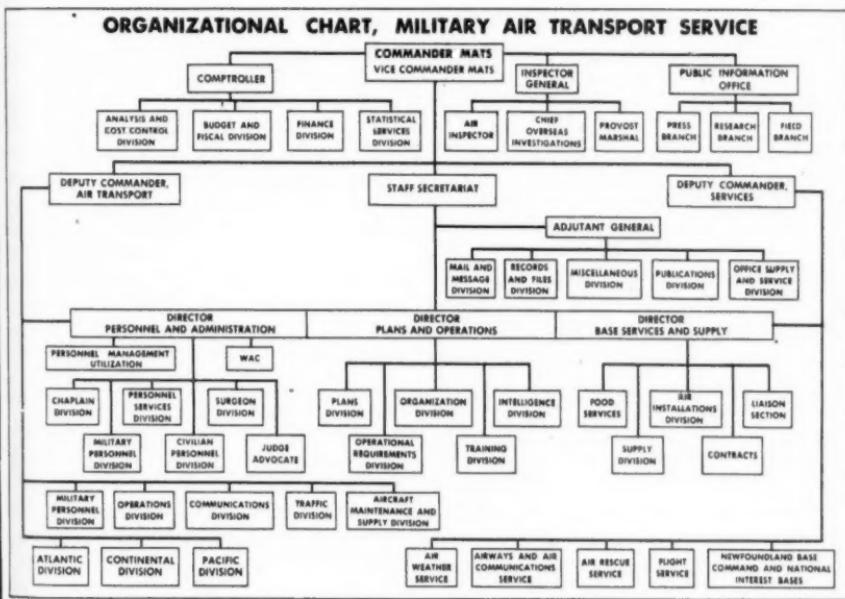
MATS' solution to its organizational problem is shown on the accompanying chart. British precedence is seen in the appointment of two deputy commanders, one for air transport and the other for services; these deputies exercise both command and staff supervision over their respective activities. To assist both deputy commanders, a three-directorate common-

In carrying out its world-girdling mission, Military Air Transport Service has organized its headquarters on the cross-servicing idea now being developed throughout the National Military Establishment

functions staff is organized. The secretary of the staff coordinates the administration of the directorates but does not control their staff work. Staff directors report to either of the deputy commanders, depending upon the nature of the problem considered. Each deputy commander can and does control the staff directors and assigns work to them within his field of activity. Likewise, the directors perform common staff functions for the four

special air transport staff, although this maintenance section also exercises staff supervision over the maintenance of the Services' aircraft. Thus MATS has placed into effect a prototype of the cross-servicing principle now under development in the National Military Establishment as a whole.

The special staff of the Deputy Commander, Air Transport Operations, functions as a command headquarters for air



technical services. This scheme was adopted with the aim of minimizing the performance of duplicate functions within the combined headquarters. This effected personnel savings and concentrated specialized abilities into fewer cells of the headquarters structure. However, expediency dictated exceptions to the general rule. As an example, aircraft maintenance, so vital to the success of scheduled air transport operations, is a part of the

transport divisions, wings, groups, and squadrons in the field. The Deputy Commander, Services, because his four technical services have their own specialized staffs, has required the direct assistance only of a Vice Deputy Commander, but not of a special staff section functioning solely under him. His staffs are those of the services and the directorates. Frequent staff conferences and daily reading files permit him to use and control these staffs

so as to effect performance of his command functions.

This organizational scheme apparently violates some of the principles of organization generally considered as good. To cite an example, the directors definitely report to more than one individual. The principle of uniformity in organization was violated also in placing the common aircraft maintenance function under the deputy commander for air transport operations. In a few cases, after three months experience, other common functions, such as manpower, are being returned to the Services' headquarters. These revisions have been minor. The best answer that can be made to theoretical criticisms of the staff organization is that it has worked well under difficult conditions. The Military Air Transport Service was formed from the Air Transport Command and the Naval Air Transport Service. The new MATS staff, now at a strength less than the former Air Transport Command headquarters alone, was confronted immediately with the difficulty of welding Navy

and Air Force elements into one. That is being done smoothly and well, even to the extent of prescribing uniform aircraft markings. Only at squadron level have Air Force and Navy units retained their separate identity, and this is dictated by statutory considerations. Besides this difficult organizational problem, Operation *Vittles*, the airlift into Berlin, has tested the mettle of the new MATS staff. MATS organized and manned the *Vittles* task force staff, which operates under control of the European Air Command. In addition, MATS squadrons, transferred to Europe on short notice, have provided a portion of the *Vittles* airlift capability. This required a complete revision of MATS' schedules elsewhere as well as a realignment of weather and communications facilities. Extraordinary problems like these provide the best test of a staff's capabilities. The homogeneity achieved in MATS is illustrated by Navy Admiral Tomlinson, commanding the Pacific Division. He tucks his tie into his shirt like a general, but his Air Force chauffeur has learned to say "Aye, aye, sir."

One of the lessons which have most clearly come from the costly and dangerous experience of this war is that there must be unified direction of land, sea and air forces at home as well as in all other parts of the world where our armed forces are serving.

President Harry S. Truman

We must rely on properly balanced forces, land, sea and air, as the true index to strength.

That means intensified coordination and cooperation between the services, Army, Navy and Air Force, under a common plan of national defense. To this objective the Air Force is pledged, as a co-equal member of the country's team.

General Carl Spaatz

The Strategic and Tactical Influence of Disease in World War II

Part I

John E. Gordon, M.D.

As a Colonel in the Medical Corps, Dr. Gordon was Chief of the Preventive Medicine Division, Office of the Chief Surgeon, ETO. The subject of this article has been presented to the fourth year class of the United States Military Academy and to the medical ROTC unit at Yale University, and also printed in the "American Journal of the Medical Sciences." Dr. Gordon is now Professor of Preventive Medicine and Epidemiology, Harvard School of Public Health, Boston, Massachusetts.—The Editor.

THE memory of men going ashore on a Normandy beach or approaching a Pacific island—American soldiers going into action—is still too vivid to leave any doubt as to where wars are finally won or lost. As certain as that may be, modern warfare is such that influences other than the courage of the men concerned or the quality of their leadership in combat, act strongly in determining the result. Disease and injury, and the quality and kind of medical care, constitute one such factor.

No attempt is made here to determine the relative importance of medicine and the other necessary services supplied to

combat forces. It is likewise left to others—to the professional soldier, the statesman or the historian—to state the place of medical matters among activities that involve the whole of a population at war; the production of war materials, the management of economic stresses, and the maintenance of that fine balance of political and social interests within a nation and in respect to its allies.

Few medical officers would attempt either evaluation; certainly not a civilian physician-soldier whose service was limited to the army in the field. The present analysis is confined to some of the ways that medical affairs enter into the management of military operations and the extent to which they influence the result. Since the experience and the data are wholly of Army origin, the consideration of strategic and tactical influences of disease will relate only to that part of military activities. Most of the examples cited are from the European Theater of Operations of World War II.

Responsibility for Health

That the maintenance of the health of troops is a function of command is an

Disease and injury, and the quality of medical care, are among the many influences which determine the final result in modern war. Here is the record of the Army's experience with disease in World War II

accepted part of military theory and so prescribed in the regulations of the United States Army. Time was when this meant principally an adequate attention to the care of the sick and wounded. The past half century has brought about a greatly broadened interpretation of this obligation, to the extent that the pre-

upon the extent to which they are integrated into a single practice, which recognizes no sharp distinction between what is preventive and what is curative medicine.

Medical care in military practice has come to involve much more than the simple issue of death or recovery. Increasing



The 8th Evacuation Hospital in the Pietramala area of the Italian front, early in 1945.—US Army photo.

vention of disease now ranks as a co-ordinate activity.

While modern military medical practice has two principal objectives, those of medical care and preventive medicine, the organization for provision of these services is by no means to be interpreted as consisting of two parts. These primary interests overlap, and the successful accomplishment of both objectives depends

attention is directed to the development of improved methods for the prevention of physical defect after disease or injury, and for limitation of the period of disability. Both features act toward the welfare of the individual, and from the viewpoint of military operations, are important considerations as they affect available and effective manpower. They represent medical care directed toward preventive ends.

Atop
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show



Atop a mountain in Italy, above, just captured by the 85th Division, Medical Corps men of the Fifth Army establish a medical collecting point in September, 1944. Below, are shown several huts forming a part of the 14th Evacuation Hospital, at Tikak, Assam, India, in December, 1944.—US Army photos.



Preventive medicine has likewise developed far beyond its original interest in the control of the communicable diseases and a concern of environmental sanitation. The prevention of disease in general, whether it be communicable or non-communicable, is now an established part of the program for prevention, together with a major interest in the limit of traumatic and other injuries. In military practice, clinical and preventive medicine have become so nearly equal in emphasis that medical influences in military operations might be approached equally well from a consideration of the strategic and tactical influence of health, as from the standpoint of disease.

Administrative Mechanisms in Military Medicine

Since the responsibility for health is a function of command, it follows logically that need exists for a command adequately informed of health activities and health methods. The medical officer, and the other technical experts of the Medical Department charged with health matters through delegated responsibility, have equal need for an appreciation and understanding of military matters. The failure of a commander to understand and evaluate medical risks can be just as costly as to misjudge the fire power of the enemy. A lack of understanding on the part of the physician of that fine balance between military necessity and medical losses can be similarly inhibitive of the common effort which is the successful prosecution of a campaign.

No remote suggestion is advanced in discount of the idealism that characterizes the practice of medicine; that is one of the finest parts of the profession, but war is not an idealistic business. It becomes necessary at times to look upon the health problems of a command from the standpoint of the group, to accept minor losses in order to effect major gains, and to weigh cost against military objec-

tive. The physician in military practice soon comes to appreciate that much of what he hopes to accomplish depends upon the support, the understanding and the aid that comes from his commanding officer. The medical officer must be equally cognizant of the objectives and requirements of command, for the measure of common accomplishment is generally determined by how well they understand each other.

These considerations are introduced because they are believed fundamental to an understanding of the influences that disease exerts on the conduct of war in the field, and to proper interpretation of the health record that results. This being the primary purpose of this presentation, rather than the methods and organization involved, a brief consideration of the three lines of approach to the management of health matters will suffice.

Command is called upon for a good deal more than intelligent understanding and direction of health activities. There is need for active participation. The good commanding officer gives interest and attention to the clothing, equipment and general well-being of his men, as well as to the adequacy of their training and the state of their military bearing.

The direct responsibility for provision of medical care to the sick and wounded falls wholly upon the Medical Department. The elaborate provision for casualties in the forward areas during the war just past has been thoroughly and adequately described.

A fundamental difference between the services directed toward medical care and those of preventive medicine is that successful accomplishment of the latter depends to a far greater extent on a cooperative effort of all arms and services. The supervision and control of preventive activities is, to be sure, a function of the Medical Department and much of the technical service is provided by that part of the Army—the inspection and control of food

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supplies of animal origin by the Veterinary Corps, and the laboratory services so essential to the modern program of prevention.

The unit surgeon is the health officer of his organization and he is aided by the special divisions of preventive medi-

sewage and refuse and other activities which enter into the program for environmental sanitation. The food program of the Army brings into play a close cooperation of Medical Department and Quartermaster Corps. The Medical Department is charged with the adequacy of the ration,



Battle casualties—such as these being treated at an advance aid station in France, August, 1944—and non-battle and disease casualties, comprise the three categories of military casualties.—US Army photo.

cine which are a part of all major commands. These strictly medical activities are, however, only a part of the comprehensive program for prevention. The Corps of Engineers has responsibility for the provision of potable water, the disposal of

the Quartermaster Corps provides it to troops and assures its quality. The design and provision of satisfactory clothing and equipment are other responsibilities of the Quartermaster which relate strongly to matters of health. The provost

marshal finds direct participation in health activities by way of the program for control of venereal disease, and in the prevention of accidents. The chaplain also has a concern with venereal disease control, and a still broader interest through matters of psychologic and moral well-being which enter so largely into the health of an Army. The Special Services Corps was a principal agent in public health education. In summary, preventive medicine in the Army as in civilian practice depends for its success upon a community effort. It succeeds in its objectives to the extent that the various arms and services are brought into a common program.

Classes of Military Casualties

Military casualties are divided into three categories, those of battle casualties, non-battle injuries, and those the result of disease. Disease is thus set apart from injury as a source of disability, with a further distinction of injury as it relates to battle or non-combat origin. The separation of the many conditions involved is generally clear cut, but for some the decision is made arbitrarily. Trench foot contracted by soldiers in the line is classed as a non-battle injury, although reasons of lesser moment have been advanced in claim of combat status. It is likewise evident that similar events are classified differently according to the circumstances under which injury took place. A gunshot wound of the hand incurred accidentally in a training area, or contracted anywhere as a self-inflicted wound, is a non-battle injury, and distinct from the battle casualty that results through contact with the enemy.

The measurement of losses from whatever cause is accomplished by computation of rates that relate to three principal demographic characteristics. The first of these, mortality, is the expression of the number of deaths from a particular cause that occur per unit of population and time,

the ordinary unit of population being 1,000 men and the interval of time one year. The rates for shorter periods are based on the assumption that the observed frequency would have continued over a year. The mortality rate represents a definite and certain military loss, irrespective of cause, of time, or of nature, and is one of the absolute indices of the cost of war.

The morbidity rate expresses the number of persons affected by a given condition as determined by patients admitted to hospital or quarters, in relation to the same units of population and time as serve for mortality. Morbidity rates as so defined do not represent all persons affected but only those seriously enough involved to be absent from duty. Nevertheless, these indices of illness as employed in military practice are more satisfactorily indicative of the existing situation than is usual in public health preventive medicine, because reporting is particularly good. The interpretation of the significance of any particular morbidity rate as an influence on tactical and strategical operations depends, in the first instance, on the duration of the disability ordinarily associated with the condition; secondly on the expected fatality; and finally on the probability for complete recovery and return to duty.

The commander of a military organization ordinarily finds the daily non-effective rate the most valuable single index of the health of troops. As the term indicates, this is representative of the number of men absent from duty by reason of disease or injury for each one thousand troop strength per day. The complementary value shows the proportion available for duty at any prescribed time.

Non-Effectiveness in the ETO

The experience of the European Theater of Operations in respect to non-effectiveness of troops by reason of medical disability is shown in Figure 1. It is to be noted here that these data and all others included in this study are from field re-

records and therefore subject to revision and correction when the final analysis of individual case records is eventually completed. The provisional data are believed sufficiently reliable to establish relationships and trends. Some are from theater sources; a great part were made available by the Division of Medical Records, Office of The Surgeon General, United States Army.

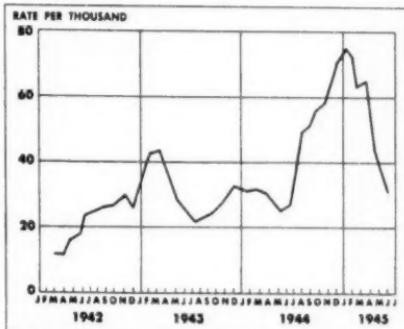
Discounting the early part of 1942 when the small troop strength accounted for irregularities in the demonstrated pattern, each year of the four year period of World War II saw the high point of non-effectiveness centered about the early months of the calendar year and minimal values during the summer. The seasonal incidence of upper respiratory infections was the dominating influence. Variations from year to year were not great until the latter part of 1944 when the values for all months increased precipitately over the established norm. This was coincident with the beginning of active operations in Continental Europe.

The division of this particular experience into the three components which make up the total non-effective rate (Figure 2) gives ready demonstration of the factors involved. The non-effectiveness related to disease continued according to established pattern, with rates in 1945 almost identical with those that characterized 1944, the year just preceding the campaign. A significant part of the excess non-effectiveness came about through a greater frequency of non-battle injuries, principally trench foot. The most important variable was that of battle casualties, the data of Figure 2 demonstrating clearly that the high non-effectiveness of the campaign period was due to that cause.

The generalizations to be drawn from this experience are that year in and year out the principal cause of non-effectiveness of troops is disease. The losses from non-battle injuries are ordinarily much less,

Figure 1.

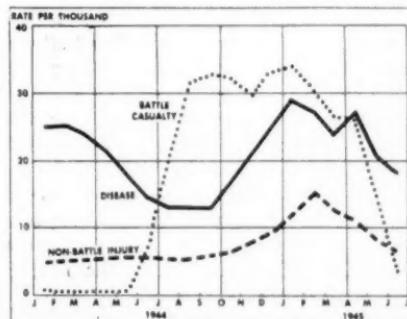
Average Daily Non-Effective Rates Per 1,000 Strength, European Theater of Operations, U. S. Army, by Months, February 1942 to June 1945, inclusive.



about one-fifth those from disease. The non-effectiveness that comes from battle casualties is subject to great variation and is wholly related to the nature of operations. The impression is not to be left that the cost in battle casualties is unpredictable, for the expected losses in a major op-

Figure 2.

Average Daily Non-Effective Rates Per 1,000 Strength, Disease, Non-Battle Injury and Battle Casualty, European Theater of Operations, U. S. Army, January 1944 to June 1945, inclusive.



eration can be computed with an exactness rivalling that of disease and injury.

It is noteworthy that the rates for all three classes of casualties are susceptible to irregular fluctuations which can be related with much certainty to environmental, seasonal, or any other ecologic factors. The peaks of excess incidence that mark the behavior of battle casualties and non-battle injuries are as outstanding as any introduced into the curve for disease through action of an epidemic in the common definition of the term.

Disease as a Factor in Military Operations

That disease as a cause of death and disability has become a matter of far less significance in the wars of the past half-century is a matter of general knowledge. It is not so generally appreciated that the changes that have occurred are qualitative as well as quantitative.

The ratio of deaths from disease to deaths from battle casualties for the wars of the Eighteenth and Nineteenth Centuries was sometimes as great as thirteen to one. A generally accepted ratio was four to one, as for example, in the Turko-Russian war of 1877-78 where deaths from disease numbered approximately 80,000 and those from battle casualties 20,000. The ratio during the campaign in the Crimea was even greater, with some 70,000 deaths from disease and 7,500 from battle casualties among the French forces. Essentially two-thirds of the deaths that occurred in the Union Army during the American Civil War were from disease, which marked an improvement over the Mexican War of 1846-47 when deaths from disease outnumbered those from battle casualties seven to one. The record during the Spanish-American War was less satisfactory, with an excess of deaths from disease over losses in battle in the proportion of about thirteen to one.

Fewer deaths from disease than from

battle casualties were noted for the first time (Table 1) in the War of 1864 which Denmark waged against Austria and Prussia. Both opponents established a ratio of one death from disease to two for casualties of battle. The number of men engaged in that war was small, communications between the armies and home countries were good and environmental conditions were favorable; and yet this was a remarkable event, a turning point in the history of wars. The Franco-Prussian War of 1870-71 was the first major war to see the new ratio maintained, by the German army with a proportion of 0.86 deaths from disease for each battle casualty. The health record of the German army has indeed been consistently good, for of five wars dating from the Danish action of 1864 and including World War II, deaths from disease have been less than those from battle casualties with the single exception of the War of 1866 and that was close to parity. The Russo-Japanese War of 1904, the next great conflict after the Franco-Prussian War, gave the Japanese forces an opportunity to set a new record of 0.37 deaths from diseases per battle casualty. World War I was the first American experience in which a similar result was attained, provided troops in the active European campaign of 1918 are considered. For the army as a whole and representative of all men under arms, the ratio was still in favor of disease (Table 1). World War II brought a complete departure from previous experience, and a health record never approached previously in any war.

The gains which have been made in recent times in the reduction of disease are primarily due to improved control of acute infectious processes. Not only are deaths far less frequent in proportion to those at risk, but the incidence of communicable disease is decidedly less. This has brought significant changes in the qualitative character of the losses that still result from

Deaths from Disease and Deaths from Battle Casualties in the Principal Wars of the Past One Hundred Years.

War	Deaths			
	Disease	Battle	Disease	: Battle
Mexican War 1846-47 (United States)	10986	1549	7.03	: 1
Crimean War 1854-56 (French)	70000	7500	9.33	: 1
Civil War 1861-65 (Union Troops)	186216	76216	2.44	: 1
Danish War 1864 (German)	310	738	0.42	: 1
(Danish)	820	1446	1.57	: 1
German War 1866 (German)	5219	4008	1.30	: 1
Franco-Prussian War 1870-71 (German)	14904	17225	0.86	: 1
Russo-Turkish War 1877-78	80000	20000	4	: 1
Sino-Japanese War 1894-95 (Japanese)	15850	1311	12.09	: 1
Spanish-American War 1898 (United States)	4795	379	12.65	: 1
Philippine Insurrection 1898-1902 (United States)	4409	1036	4.26	: 1
Boer War 1899-1901 (British)	11377	6425	1.77	: 1
War in South-West Africa 1904-07 (German)	689	802	0.86	: 1
Russo-Japanese War 1904-05 (Japanese)	21802	58257	0.37	: 1
(Russian, less Port Arthur)	18830	23008	0.82	: 1
World War I 1914-18 (French)	1750000	924700	1.89	: 1
(German)	155013	1531048	0.1	: 1
(United States, all troops)	58119	50385	1.11	: 1
(United States, A.E.F.)				
(Europe)	21314	50385	0.42	: 1
World War II 1939-45 (United States, European Theater)	1432	122384	0.012	: 1

Table 1.

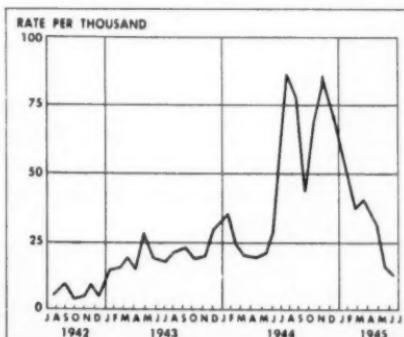
disease as distinguished from injury and battle casualties. Non-communicable disease has become a far more significant consideration. That the frequency of this class of disability has a direct relationship to military operations is illustrated by the data of Figure 3.

Neuro-Psychiatric Disease

During the time that active combat operations involved only a small proportion of American troops in Europe—those of the Air Force based in Great Britain—the rates for neuro-psychiatric disease were fairly stable and at a satisfactory level. For the whole experience, admissions for this cause constituted about 7 per cent of all disease. The influence of major field operations is evident in the rise in frequency that took place in the summer of 1944 when the continent of Europe was

Figure 3.

Neuro-Psychiatric Conditions, Admissions to Hospitals and Quarters, European Theater of Operations, U.S. Army, Rate Per 1,000 Strength Per Annum, by Months, July 1942 to June 1945, inclusive.



invaded. The excess incidence was as sharply defined, and interjected as precipitously, as that of any epidemic of acute upper respiratory infection or other communicable disease. In July 1944 about one-fourth of medical admissions were of this class. As the pressure of assault operations was relieved, the frequency of neuro-psychiatric conditions declined as promptly as it had arisen—despite the fact that this was a period of relatively active field operations marked by the rush across France and the approach to the German border. The outstanding difference was that this was a conquering army, advancing rapidly and successfully against an enemy that offered little resistance.

The frequency of neuro-psychiatric disease again rose sharply when the attack was resumed in November; and a second peak of excess incidence duplicating that of the first was associated with the stubborn active defense action brought about by the Battle of the Bulge. Thereafter, the rates declined progressively and in marked degree, despite the active offensive action of February, March, and April, when the Rhineland was invaded and the Inner Reich eventually occupied. The rates then were little more than during the relatively peaceful days in Great Britain be-

fore the continental campaign got under way.

The changing character of losses from disease is equally well illustrated by the kinds of conditions that entered into mortality rates from that cause in the European Theater. Considering the entire period of operations, five more deaths were recorded from alcohol poisoning than from all communicable processes combined, to include not only the usual epidemic diseases, but all other infectious processes such as tuberculosis and the pneumonias.

By either of the two principal criteria by which the effects of disease are judged, mortality and morbidity, the communicable diseases have decreased significantly as a factor of importance in military operations. Qualitatively the non-communicable processes have attained a significance out of proportion to previous experience. The effect that these changes have had on the total losses from disease are illustrated to advantage by an examination of the experience of the European Theater of Operations during World War II, as compared with the American Expeditionary Forces of World War I.

(Part II of Dr. Gordon's article will appear in the April issue of the *MILITARY REVIEW*.)

Despite the fact that United States troops lived and fought in some of the most disease-infested areas of the world, the death rate from nonbattle causes in the Army in the last two years was approximately that of the corresponding age group in civil life—about 3 per 1,000 per year. The greater exposure of troops was counterbalanced by the general immunization from such diseases as typhoid, typhus, cholera, tetanus, smallpox, and yellow fever, and, obviously, by the fact that men in the Army were selected for their physical fitness.

General of the Army George C. Marshall, in the Biennial Report of the Chief of Staff of the United States Army 1943-1945.

Supply in the Airhead

Lieutenant Colonel S. E. Carlson, *Field Artillery*
Instructor, Command and General Staff College

THE problem of supplying airborne forces is often brushed over lightly by the statement that it is a most complicated and difficult function. In this discussion an attempt will be made to rationalize the problems incident to planning supply for troops in an airhead.

In order to insure a common understanding it is necessary that the terms used be defined.

Definitions

Airhead: An area in hostile territory established by an advance force to protect the landing of troops and supplies by air.

Accompanying Supplies: Those supplies of all classes carried by units into the airhead, including those supplies carried by individuals.

Unit Air Supply: That supply, in predetermined package quantities, prepared for, and delivered directly to a unit in the airhead, based on that unit's maintenance requirements for one day. It may be delivered by free drop, parachute, glider, or landing cargo aircraft, or a combination of these types of delivery.

Replenishment Supply: That supply required for daily maintenance and reserve build-up, transported to the airhead for

delivery to supply points in the established maintenance area of the major administrative unit in the airhead.

Phasing Supply

The supply plan in an airborne operation must first be approached from the viewpoint of phasing or scheduling supplies according to the various methods listed above. Assume, for purposes of illustration, that the airborne force will be relieved by land forces in ten days. This will then necessitate that the airborne force be supplied its daily maintenance requirements from D-day through D plus 9. After relief by land forces, a minimum of one day's time will be required to receive and issue the supplies brought in overland. Therefore, an additional day's supply must be provided in the airhead to insure that requirements for consumption are met through D plus 10.

Schematically then, our airhead supply phasing problem is as shown in Figure 1.

Accompanying Supplies

How are accompanying supplies carried? They are in aerial delivery containers parachuted into the airhead, in gliders, and on the individual soldier, whether he comes in by parachute or glider.

Supply in an airhead supports the operation, and is not the operation itself; all possible eventualities must be taken into account in advance, and the planning must begin before the mission is assigned

What supplies should accompany troops? The supplies to accompany troops should be those that are necessary to sustain successful combat. Normally an airborne unit's Standing Operating Procedure (SOP) will specify the items of supply to be carried for general airborne operations. The supply planner must examine the items of this standard loading in the light of the particular mission. Conferences must be had with commanders to determine what changes should be made in the SOP supply. Technical service representatives should also be consulted. In addition to combat supply requirements, comfort items should be considered. The essentiality of items such as blankets, inclement weather clothing, tentage, and water must be evaluated. All of these items of supply must be balanced against the ability to transport, collect, and otherwise handle them on the ground in the initial period of the assault, prior to the troops becoming properly organized.

When considering the items of accompanying supply, the quantities must also be determined. Should these supplies be sufficient to last for two, three, or more days? From the logistics viewpoint, it is desirable to have sufficient accompanying supplies for the entire period of the airhead operation. The actual quantities, however, will be limited by the availability of air lift, and by the ability to recover a high percentage of the supplies on the ground in the initial period of the assault. The individual obviously cannot carry a week's supply on his back, nor will the troops be able to spend time in collecting large quantities of supplies when they first enter the airhead. Under most conditions, a minimum of three days maintenance requirements will be necessary.

Arbitrarily establishing, therefore, three days of accompanying supplies, as the amount needed initially, our supply phasing plan will appear as shown in Figure 2.

Replenishment Supply

Replenishment supply must be planned before we can consider our schedules of unit air supply. By definition, our replenishment supply consists of both daily maintenance and reserve build-up. It requires a maintenance area, and the establishment of supply points, which implies the necessity for service troops. From the Air Force point of view, it also requires air fields of sufficient capacity to handle large numbers of planes to bring in the required tonnages. Since this method of supply delivery is the most economical of all types of airborne supply, it should be begun as soon as is feasible. The considerations for feasibility will include tactical security of the airhead, adequacy of service troops and facilities, and lines of communications within the airhead. Supplies in this category cannot be brought in until there are personnel, transportation, and storage facilities, capable of properly disposing and handling the relatively large quantities. The aircraft are unloaded and the landing fields cleared of supplies by ground force personnel.

Again, for the purpose of illustration, let us assume that an air field, personnel, services, transportation, and tactical considerations justify beginning "replenishment" supply on D plus 6. The supply phasing plan will then appear as shown in Figure 3.

Note that the diagram of phased replenishment supply does not show consumption on D plus 6. Time must be allowed for unloading and distributing the items in replenishment supply. Therefore, the first day of this supply delivery cannot be included in plans for using or consuming the supplies delivered on this day.

Unit Air Supply

As is evident in Figure 3, there is a break in our supply plan. This is properly handled by unit air supply. Straightforward arithmetic shows a necessity for

FIGURE 1.

	D-day	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10
ACCOMPANYING SUPPLIES											
UNIT AIR SUPPLY											
REPLENISHMENT SUPPLY											

FIGURE 2.

	D-day	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10
ACCOMPANYING SUPPLIES											
UNIT AIR SUPPLY											
REPLENISHMENT SUPPLY											

FIGURE 3.

	D-day	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10
ACCOMPANYING SUPPLIES											
UNIT AIR SUPPLY											
REPLENISHMENT SUPPLY											

HATCHED SPACES INDICATE CONSUMPTION OR CONSUMPTION AND DELIVERY.
CLEAR SPACES INDICATE DELIVERY ONLY.

FIGURE 4.

	D-day	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10
ACCOMPANYING SUPPLIES											
UNIT AIR SUPPLY		2 days	2 days								
REPLENISHMENT SUPPLY											

HATCHED SPACES INDICATE CONSUMPTION OR CONSUMPTION AND DELIVERY.
CLEAR SPACES INDICATE DELIVERY ONLY.

FIGURE 5.

	D-day	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10
ACCOMPANYING SUPPLIES											
UNIT AIR SUPPLY		2 days	2 days	3 days							
REPLENISHMENT SUPPLY											

HATCHED SPACES INDICATE CONSUMPTION OR CONSUMPTION AND DELIVERY.
CLEAR SPACES INDICATE DELIVERY ONLY.

four days of this type of supply. From a cursory examination of Figure 3 it seems that unit air supply could begin on D plus 2, thus allowing sufficient time for recovery and distribution of these supplies. However, with the vagaries of weather apt to upset a continuous supply program, it is advisable to begin unit air supply as soon as is feasible. This may be on D-day, on D plus 1, or D plus 2, certainly no later than D plus 2. Because of weather, or any other interference, it is generally accepted that supplies should be brought in as soon as possible. Let us therefore consider the delivery of unit air supply on D-day. It is desirable to have supplies delivered in daylight hours to assist in maximum recovery. It is essential that personnel assigned to recover and distribute the supplies be organized to provide minimum loss. The tactical situation should be such that the area to which the supplies are delivered is secured sufficiently to permit supplies to be collected expeditiously if delivered by parachute; or, if landed by aircraft, that the aircraft are not endangered by ground action.

Obviously, aircraft must be available for transporting the supplies. If these conditions can be met, unit air supply on D-day is practicable and advisable. Generally, however, these conditions will not obtain on D-day.

Consideration should be given to scheduling delivery on D plus 1 on the same basis. In most circumstances or operations, the necessary conditions can be met on D plus 1.

Because of the tactical protection in the air that is necessary for cargo aircraft bringing in unit air supply, the Air Force generally will favor flying a supply mission with greater tonnages to provide possibly as much as two days maintenance requirements on one day. For these same protection requirements, the Air Force will demur against using slower gliders for unit air supply. Thus, if the cargo

airplanes cannot land, the supply will probably be by parachute.

Assume that the facilities are not favorable for receiving unit air supply until D plus 1, and that on that day the Air Force will deliver two days' maintenance requirements. The same condition can obtain for D plus 2, and for purposes of illustration, let us further assume two days' requirements delivered on that day. Figure 4 then shows a phasing plan that will meet our requirements.

A closer examination of Figure 4 shows a weakness in the plan. Non-flyable weather on D plus 6 would leave the forces in the airhead without the necessary supplies. While all supply plans must be based on weather assumptions presumed to be accurate, dependence on positive flyable weather for any one particular day in the future is too optimistic. It would appear desirable, therefore, to schedule an additional day of unit air supply to be delivered on D plus 3, 4, or 5, to insure that adequate supplies are on hand. This will provide as additional safety factor of twenty-four hour's supply requirements for the day in question. If an additional supply mission were flown on D plus 3 with this supply our completed phasing plan would be as shown in Figure 5.

Losses in Airborne Supply

Before the supply planner can feel sure that his supply plan will provide for the operation, consideration must be given to the probable or possible losses that may occur. Recovery of supplies may be 100 per cent of those loaded aboard the aircraft at departure bases, or it may, as has happened in the past, be as low as 30 per cent. Supplies can be so scattered that it will be impossible to accomplish recovery by the time they are required. Aircraft may be shot down, supplies may be taken by civilian enemy personnel in the airhead, or the items may be so damaged in delivery as to render them unusable. The accom-

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panying supplies may be consumed, lost, destroyed, or captured, and instead of three days of supplies on hand initially, only one day's maintenance requirements may be available. Thus in establishing the quantities of any item or group of items, allowances for losses must be taken into consideration. This will vary from a high percentage of loss when supplies are delivered by free drop to a comparatively low percentage of loss of supplies when they are delivered by landing cargo aircraft.

To provide in some measure for losses that cannot be foreseen with accuracy it is necessary to arrange for replacement of such losses.

On Call Unit Air Supply

The replacement of losses, rates of consumption or expenditure beyond that planned, or any unforeseen contingency, must be provided for. This is done by arranging for "package quantities," such as are provided in unit air supply, to be available at the departure airbases for delivery on call. The desirability of "package quantities" is apparent when consideration is given to the difficulties of ordering supplies when distance or enemy activity might seriously affect communications. It would be impracticable to forward detailed requisitions by radio over the distances involved with the equipment available in the airhead. Therefore, the "on call" supply plan must be as simple as possible, with sufficient alternative means of calling for supply in the event radio communication fails. This might be done by panel signals, smoke, or other such devices that can be seen and interpreted by reconnaissance aircraft. Similarly, plans for cancelling scheduled deliveries of supplies should likewise be provided, in the event that scheduled quantities of supply are not required.

Obtaining Supplies

Successful supply to the troops in an

airhead is the result of a well-executed triple play. The assault airborne unit must make its requirements known to the supporting agency, which generally is the section of the Communications Zone in which the operation is mounted. This agency in turn delivers the supplies to the Air Force for delivery to the airhead. The over-all responsibilities are definitely delineated. Consider an airborne division for an example.

In an airborne operation of a single division, the division will prepare its list of requirements for accompanying supply. These supplies will be drawn from the designated agency and issued to the subordinate units of the division. These units then prepare the supplies for loading aboard the aircraft and load them so that they will accompany the troops in the initial assault.

In providing for unit air supply, the division again requisitions the supplies from the Communications Zone section. This agency delivers these supplies to the sites stipulated by the appropriate Air Force commander. The Air Force receives the supplies, packages them for the type of delivery planned, and in accordance with the mutually-coordinated schedule, makes delivery.

The same procedure is followed for replenishment supplies. In all cases the responsibility for requisitioning the supplies is vested in the airborne force.

Coordination

Close coordination is essential in accomplishing successful supply to the airhead. This is particularly important inasmuch as the time for preparation and planning for a specific airborne operation is generally very limited. It is not sufficient for the airborne supply planner to merely requisition the supplies required. The planner must make certain that the supporting and delivering agencies thoroughly understand the supply require-

ments of the operation, are familiar with the limitations as concerns substitute items, and realize the necessity for meeting the delivery schedules. This can only be done successfully if the planner is fully cognizant of any limitations in the capabilities of the Communications Zone and the Air Forces. With the short time that is generally available for the necessary coordination, it must be begun before a specific mission is assigned.

This coordination and understanding of requirements is particularly important in handling requests from the airhead for "on call" or emergency supplies, to insure that both agencies take whatever action is necessary.

Distribution of Supplies

Accompanying supplies are handled in the airhead by the individual soldier and subordinate units. Accompanying supplies beyond the individual's needs or ability to carry may be placed in company or battalion dumps, or even assembled by higher echelons, for distribution as needed.

Unit air supply is recovered from drop zones or unloaded from aircraft by service elements, perhaps augmented by other personnel as may be needed or can be spared from other duties. In a division operation, the recovery of unit air supply is usually supervised by the division quartermaster, using the quartermaster company and such other service personnel as are available. Unit air supply is collected in bulk, sorted, and then placed in dumps by the technical services.

Replenishment supply, including as it does the build-up of reserves besides the daily maintenance requirements, requires a more complex organization. The large tonnages involved in this category of airborne supply requires greatly increased

quantities of personnel and transportation to unload the incoming aircraft in the shortest possible time. Supplies must be cleared from the air fields as expeditiously as possible. The details of unloading and removing supplies require a maximum of direction and control, even to the extent, in larger operations, of setting up special organizations to handle this problem.

Summary

In planning the supply of an airborne operation, we therefore must first determine our phasing of supplies by the various methods of supply available. A determination of the quantities and items are then made. Requisitions are prepared, taking into consideration probable losses of supplies, and emergency or "on call" quantities arranged for. Supply deliveries are coordinated and the capabilities of the agencies concerned are employed. Adjustments are made to provide for any limitations, and the complete supply plan tied together.

In the final analysis, the supply in the airhead is supporting the operation, and is not the operation itself. Some of the conditions which the supply planner might consider to be requisites may be overruled by the commander on the basis of a calculated risk. In this respect, the supply plan is coordinated very closely with the commander, and the approval of the commander sought for the different elements of the supply plan as it is being formulated.

Supply in an airhead is complicated only in that all possible eventualities must be provided for in advance of the operation, and that planning and arrangements must begin before any specific operation or mission is assigned.

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The Department of Intelligence of the Command and General Staff College

Lieutenant Colonel Richard W. Whitney, *Infantry*
Instructor, Command and General Staff College

RECENT years have witnessed a remarkable expansion of American views on the objectives and purposes of military intelligence. Fundamentally, this directly reflects the development of new, vastly more destructive weapons and faster means of transportation. These mechanical developments are destroying the cushion of time that we formerly had to mobilize our manpower and industry before an enemy could launch a large-scale decisive attack on our homeland. It is more and more widely recognized that only through the most diligent collection and analysis of every scrap of data that might shed light on the war plans of a potential aggressor can we hope to make up for the time element that has been taken away from us. In other words, military intelligence has become an integral part of our national defenses, in peace as well as in war. No longer is its concern almost exclusively the armed enemy on the battlefield. No longer can its production safely be left until armed conflict begins.

With this magnification of the purpose and scope of intelligence came a corresponding need for expansion in the training of intelligence staff officers. To assist in satisfying this need, the School of In-

telligence was established during the 1946 reorganization of the Command and General Staff College. In 1948 the School was redesignated the Department of Intelligence.

The goal of the Department of Intelligence within the framework of the College mission is threefold. First, it aims to train selected individuals for service as intelligence officers in tactical headquarters from division to theater level and in corresponding Communications Zone and Zone of Interior headquarters. A concurrent objective is to provide these officers with an adequate background in the fundamental principles, processes, and application of strategic intelligence, to qualify them for duty with the Intelligence Division, Department of the Army. A third and important aim is to inculcate all future commanders and staff officers with the importance of both strategic and combat intelligence and to instruct them in the application of each.

The Department of Intelligence receives approximately one-fourth of the students of each class attending the College for 300 hours of specialized intelligence instruction during their ten-month course. Prior to this specialized training the stu-

The Department of Intelligence seeks to impress upon its graduates that a leader among nations or men cannot long remain a leader without first obtaining and using accurate, timely and complete intelligence

dent will have completed approximately 840 hours of tactical instruction during which approximately seventy-five hours are devoted to the organization, duties and operation of the combat intelligence section in units from division to army level and in the Communications Zone.

Common Instruction

The intelligence subjects taught all students in the common phase of instruction at the College are too numerous to list in their entirety. However, some of the more important are worthy of mention:

Basic concepts of intelligence, definitions, and principles.

Sources of information and their relative value.

Organization and functions of Division, Corps, and Army G-2 Sections.

Intelligence agencies in the Division, Corps, and Army (capabilities and limitations of each).

Collection Plan and Intelligence Estimates, Annexes, and Periodic Reports.

Determination of Enemy Capabilities and Essential Elements of Information.

Air Photo Intelligence, Air Reconnaissance, and Air-Ground Intelligence Cooperation.

Counterintelligence Planning and Counterintelligence Operations.

Processing information into intelligence.

Intelligence and counterintelligence planning in Amphibious, Airborne, and Mountain Operations.

Terrain and weather studies.

Intelligence training.

Enemy Order of Battle.

Intelligence and counterintelligence organization, functions and responsibilities in the Communications Zone or Section Headquarters, Ports and Installations.

G-2 participation in Division, Corps,

and Army Operations (map exercises and map maneuvers).

When the student arrives in the Department of Intelligence for his specialized training he is already basically grounded in the duties, responsibilities, and techniques of a combat G-2 in the various tactical and Communications Zone headquarters. The task then remains to broaden his knowledge of the intelligence function in the higher levels of command, with emphasis on intelligence planning for projected operations, the finer points of technique at all tactical levels, and principally to provide him with a substantial foundation in strategic intelligence. The faculty of the Department of Intelligence has been specially selected and the curriculum of this specialized phase is carefully designed to accomplish this mission. The faculty represents all the levels of intelligence experience during World War II, from Division G-2 to the Theater Intelligence Division and the Intelligence Division, War Department General Staff. The present curriculum is the product of prolonged and serious consideration guided by the mission to be accomplished, the time limitation, and recommendations from members of the two classes already graduated. Applying the principle that the student learns best by doing, a considerable portion of the curriculum is devoted to applicatory exercises. In these, the student, following the lessons and principles taught him, participates in research for information, the actual production of intelligence, and the preparation of intelligence plans for hypothetical military operations.

Specialized Phase

Space and security restrictions prohibit a detailed listing of the subjects covered during this specialized phase, so the curriculum for the specialized phase is merely summarized, as follows:

54 Hours—*Combat Intelligence*
Division, Corps, and Army intelligence planning.

Enemy Order of Battle.

Combat Intelligence processes (collation, evaluation, interpretation).

Essential Elements of Information. Reports, Annexes, Estimates, Plans. Terrain and weather studies.

Counterintelligence in the Combat Zone.

190 Hours—Strategic Intelligence

Terrain estimates of all land areas of the world.

The factors of Strategic Intelligence and their application:

Political	Technological
Economic	Biographic
Sociological	Military
Scientific	Topographic

Practical work in research and analysis to compile digests of factual intelligence and estimates of war potential of selected nations.

Strategic Intelligence processes.

Techniques of Collection and Reporting of Information.

Current world problems of strategic significance.

Organization and functioning of the Intelligence Division, Department of the Army.

Security and Strategic Counterintelligence.

Strategic Intelligence functions of other government agencies.

56 Hours—Theater Intelligence

Organization, assignment of responsibilities, preparation of Standing Operating Procedure for Theater G-2 Section and Intelligence Planning at theater level for proposed operation.

During this specialized phase several periods are devoted to applicatory work in committees on intelligence planning tasks or other G-2 functions for which there is no precedent evolved from war experience nor from any Department of the Army doctrine or prescribed technique. This, in effect, is a valuable "laboratory" period in which student groups are guided only by the principles they have been

taught, their own experiences, and common sense. Not only has this procedure stimulated interest but it has resulted in the production of valuable ideas and many acceptable procedures and techniques, some of which are worthy of standardization.

As a part of their laboratory work the students of a recent class compiled a Combat Intelligence Handbook which after review, modification, and editing is soon to become the Command and General Staff College text on combat intelligence as a supplement to FM 30-5, "Combat Intelligence." Texts on strategic intelligence have been made available by the Intelligence Division, General Staff, United States Army. Manuals pertaining to Aggressor Forces are used during the combat phase of specialized instruction.

As might be expected, the Department of Intelligence maintains an extensive library and archives apart from those maintained by the College. These contain not only documents of current intelligence interest but also reference texts on many subjects relating to all countries of the world.

Representatives of the highest level intelligence agencies of the government and the military services periodically come to address the students in the Department of Intelligence. From such representatives students receive first-hand knowledge of current national problems, probable future developments, and an insight into the working relationship between the various government agencies which collect, produce, and use intelligence.

Associate Course

During each academic year the Department of Intelligence also conducts 210 hours of specialized instruction for students in the Associate Course. These are officers of the civilian components who are selected to attend a three-month course at the College and are ordered to active duty for that period. The intelligence instruction is a slightly condensed version

of the specialized instruction given to the Regular Class. The graduates of the Associate Course, who have elected to improve their military knowledge and to keep abreast of new developments and techniques, provide a ready source from which the Department of the Army may draw well-trained staff officers and commanders in periods of military expansion. It is obviously vital that all officers of the civilian components have at least a working knowledge of the principles, techniques, and applications of strategic as well as combat intelligence. This is further accomplished through the Army Extension Course system. The Department of Intelligence, which prepares and reviews extension courses pertaining to intelligence, within the limits of security restrictions, keeps interested officers of the civilian components informed on all new developments in this field.

The most reliable evidence of student interest during these specialized courses are the frequent requests for additional extra-curricular lectures or conferences on selected subjects. These are conducted informally at night and never is attendance, which is voluntary, far from 100

per cent of the class. Common reactions voiced by students are in the vein of: "If I knew then what I know now, how much more intelligently and efficiently I could have performed my wartime job." Another interesting reaction is expressed as follows: "Even reading the newspaper is a new experience because I find myself attempting to analyze and to attach the proper significance to this or that course of action taken by a nation in the course of today's world affairs."

Admittedly, not all students who attend the specialized phase of the Department of Intelligence will become G-2s or strategic intelligence analysts in the higher levels of command. However, all of them are potential commanders. In the past, too many commanders have met disaster or paid too heavily for victory because they did not recognize the need for intelligence. For this reason, the Department of Intelligence will make a great contribution to the future security of this nation if it can but fix in the minds of its graduates one precept: A leader among nations or a leader among men cannot long remain a leader without obtaining and using accurate, timely and complete intelligence.

Feb 1949

It is not the responsibility of your armed forces to predict, to estimate, or to venture the political or even the military intentions of other states. Rather we are concerned with those military capabilities which could be brought to bear in pursuit of national ambitions.

When those military capabilities are overwhelmingly concentrated in the hands of aggressive states, and when they pose a threat to the free and peaceable competition of nations in the political and economic arenas of the world, then we feel it our duty to urge that deterrents be mobilized against the possible use of that force.

General Omar N. Bradley

For our own security, for the wise and realistic conduct of our foreign relations, and for world peace, we must develop foresight through the very strongest and most efficient intelligence and counter-intelligence services which American energy, ability, and imagination can develop.

Armed Forces Talk

Strategic Air Operations and Organization

Lieutenant Colonel Travis Hoover, *United States Air Force*
Former Instructor, Command and General Staff College

IN a consideration of strategic air operations and organization, the analysis logically falls into four principal parts: The mission of strategic air operations, the organization and composition of the forces necessary to carry out this mission, the equipment demanded by such a force, and the actual employment of this equipment by the organization to accomplish the mission.

Mission

The mission of strategic air power may be, and as a matter of fact has been, stated in many ways. However, the wording used at the Casablanca Conference in the Joint Chiefs of Staff's directive for the combined bomber offensive of the Allies against the Axis sums it up quite adequately: "To achieve the progressive destruction and dislocation of the enemy military, industrial and economic structure to the extent that their capacity to wage war is destroyed or decisively weakened."

It is quite understandable how a member of the ground forces might say, "That's all well and good," and at the same time ask the question, "But how does this affect me? Just what effect will strategic bombing have upon my part in a war? In other

words, in what way and how much do strategic air operations affect the tactical plan?" To those who have been in Nuremberg, Berlin or similar German cities or have seen Tokyo, Hiroshima or Nagasaki, it is quite obvious that such bombing made the invasion of Europe possible, and the subsequent successful accomplishment of the invasion much easier for the forces carrying out this operation, and in the case of Japan it made invasion unnecessary. This was not an incidental result of strategic bombing, but a pre-planned objective. In the plan for Operation *Overlord*, it was stated that the combined bomber offensive must be successful before the invasion could be launched.

Effects of strategic air operations on the tactical plan fall into two categories, direct and indirect. Some of the principal direct effects were:

a. Strategic bombing directed against German aviation industry, air installations, and oil refineries and stocks which effectively reduced the striking power of the German air arm, permitted efficient execution of our tactical plan without serious opposition from the *Luftwaffe*. As a corollary, this also minimized losses in our subsequent air operations and freed

Strategic air operations have both direct and indirect effect on the tactical plan, by achieving progressive destruction and dislocation of the military, industrial, and economic structure of the enemy

a considerable number of fighters for direct support of Allied ground units.

b. Hostile armored equipment, armament and truck transport available to interfere with execution of our tactical plan were reduced both at their sources and en route to the front by strategic bombing of matériel and associated factories and marshalling yards.

c. Strategic air operations drastically curtailed production of synthetic oil, thereby impairing hostile ground and air mobility and training. As a result, German ground units were often unable to shift laterally to meet our thrusts, to launch counterattacks against Allied gains, and frequently lost large quantities of equipment and matériel due to lack of motor fuel. Enemy pilots and motor vehicle drivers were inadequately trained due to fuel shortages. It is said by many that in the attack on oil, strategic bombers made their greatest contribution to military operations in Europe.

Some of the principal indirect effects were:

a. Manpower.—Strategic air attacks forced the Germans to tie up some two million persons in air defenses, repair gangs for effecting restitution, repairs, etc. True, many of the men involved may not have been suitable for combat, but bombing operations prevented their employment in tasks contributing more directly to the military effort.

b. Dispersal.—Strategic bombing necessitated dispersal of industry, stocks, supply installations, barracks and other military installations, to the extent that a considerable amount of manpower was diverted to effect this dispersal and provide necessary maintenance to these scattered establishments with consequent inefficiency of operation. The effect on our tactical plan is obvious.

c. Morale.—While German morale was never destroyed, it was definitely affected.

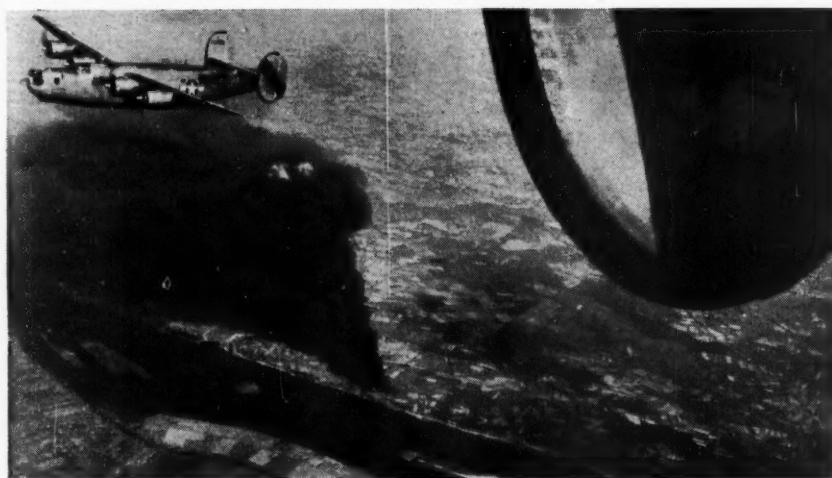
The bombing of over three and one-half million German homes necessitated granting ever increasing numbers of compassionate leaves to soldiers in order to keep them as well satisfied as possible. The result was a reduction in manpower and efficiency of German units.

Falling somewhere between direct and indirect effects is that of strategic bombing of rail and transportation systems. That this did affect our tactical plan is an undeniable fact, but damage resulting from strategic bombing is so confused with that caused by tactical air operations and destruction by the Germans themselves during withdrawal, that to catalogue it into either a direct or indirect effect may prove erroneous.

It is also significant that in 1942 strategic operations of only a few hundred bombers from bases in England caused the Germans to maintain a force of about 1,000 fighters in France and western Germany for air defense purposes. Had they been permitted to dispatch these planes to either the North African or Eastern front or to divide them between the two, the Germans would probably have attained air supremacy, at least temporarily, on either or both fronts with resultant adverse effects on the Allied tactical plan.

These are some of the effects of strategic operations. Of course, there are many others. If one turns to the Pacific and analyzes the strategic air operations against Japan, he will find the effects to be quite similar to those just mentioned.

In appraising these profound effects of strategic air operations on the tactical plan, bear in mind that these benefits are derived from, and are a result of, using strategic air power as a force to achieve the progressive destruction and dislocation of the enemy military, industrial, and economic structure to the extent that their capacity to wage war is destroyed or decisively weakened, which is the mission of strategic bombardment.



Oil plants were important strategic air targets in World War II. Above, the Rhenania-Ossag oil plant at Harburg, Germany, is undergoing a B-24 attack, August 1944. Below, the same plant is shown in a photo taken after the war; the Eighth Air Force attacked this plant nine times to keep its productive capacity crippled.—US Air Force photos.



Organization and Composition

So much for the mission of a strategic air force. Now just what is necessary in the way of an organization to carry out this mission effectively and efficiently?

First, the organization and composition of the force must be flexible because of the broad scope of the tasks that must be performed by the force in carrying out the over-all mission and to the numerous and various methods of employment under different conditions in the various theaters and the constantly changing conditions in any given theater. Flexibility is also of paramount importance when it comes to expanding or decreasing the size of the force or the regrouping of these forces to accomplish different tasks.

Mobility must not be overlooked. Together, mobility and flexibility are the outstanding characteristics of air force organization.

In analyzing the normal composition of the echelons of command and the various tactical groupings of strategic air units, one finds the squadron to be the smallest unit having both administrative and tactical functions. However, in operations, the airplanes of the squadron are flown in flights and these flights are further broken down into elements. Usually three or four squadrons are grouped together and comprise the next higher echelon of command, the group. Ordinarily there is one tactical group per air base. Each combat group plus its associated service groups constitutes a wing. Two or more of these wings comprise an air division, and two or more divisions in turn may be organized into an air corps. Two or more air corps may constitute a strategic air force. The strategic air forces are now organized into the Strategic Air Command. The approximate size of these various command organizations may be perceived by considering that a tactical group of three squadrons equipped with thirty B-29s is manned by

2,061 officers and men. The fighter group, although equipped with seventy-five planes will require only about half as many men.

Equipment

In considering the equipment which these organizations must have to carry out their assigned tasks effectively, one must understand what is actually required of such equipment.

The nature of strategic bombing that penetrates deeply into the heart of the enemy homeland and destroys his very potentials of war requires an aircraft of long-range, heavy-load carrying capacity, adequate defensive firepower, and satisfactory speed and high altitude performance characteristics. The aircraft used in fulfilling these requirements in World War II in Europe were the B-17 and the B-24. In the Pacific the demands of extremely long-ranges dictated the use of the B-29 Superfortress. Of course these airplanes have now been made obsolescent by the development of the B-36, the flying wing, gas turbine engines, and other technical advancements too numerous to mention.

The fact that bombers are not the only aircraft used in conducting strategic air operations must not be overlooked. Long-range fighters perform a most important function of furnishing protection for the bomber formations from enemy fighters. They have been used as scouting forces to pick out the most desirable route for the bombers through questionable weather. Aircraft capable of carrying out this mission of escort protection for the bombers must also have long range and at the same time possess the characteristics of great speed, maneuverability, a high rate of climb, and heavy offensive fire power. The most widely used fighters in World War II were the P-38, P-47, and P-51. These airplanes have also since been superseded by the new jet fighters.

There is still another type airplane

used in strategic operations, the photo reconnaissance plane. Photographic reconnaissance planes furnish photographic coverage for the study of prospective targets, assessment of bomb damage and inter-

maneuverability, high rate of climb, and good performance at high altitude. They usually have to sacrifice their armament for the installation of cameras. As fighter planes possess more of the desired charac-



Rheine, Germany, was a vital rail center between Berlin and Arnhem, Holland, which the Eighth Air Force attacked continuously, October 1944 to March 1945.—US Air Force photo.

pretation to determine the necessity of bombing rebuilt targets again. To carry out these functions properly the reconnaissance airplanes must normally possess the characteristics of extremely high speed,

teristics for reconnaissance, they were the ones most commonly converted into photographic reconnaissance planes; however, some bomber types have likewise been converted.

Employment

After considering the capabilities and limitations of strategic air equipment, it is only logical to consider the actual employment of these airplanes in the task of accomplishing the mission assigned.

Let us again use history to illustrate these processes. As a result of the Casablanca Conference in early 1943, the Combined Chiefs of Staff initiated a plan for a combined bomber offensive from the United Kingdom against Germany. In May 1943, the Combined Chiefs of Staff issued a directive to the United States and British forces "to conduct a joint United States-British air offensive to accomplish the progressive destruction and dislocation of the German military, economic and industrial system and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened." This is construed as meaning so weakened as to permit the initiation of final combined operations on the Continent.

Since the possible targets of air power are so numerous and varied and since the striking force available at any given time is necessarily limited, there was developed during the war a rigorously scientific method for evaluating targets and assessing their destruction.

Industrial systems and sub-systems of an enemy power must be ranked in the order of their desirability as targets by applying to each of them a series of interrelated economic and vulnerability criteria. The guiding principle in listing targets for destruction must be to determine which of the enemy's economic resources have a greater bearing on his military operations in view of our own plans.

A Combined Strategic Target Committee consisting of American and British experts was established in London in 1943 to assess the damage to the German war economy and where necessary to alter the priority of targets.

Prior to the establishment of the Combined Strategic Target Committee, the German U-boat menace was at its peak. At the same time the United States preparation for *Overlord* contemplated a tremendous amount of shipping. Submarine building yards and operating bases therefore became the top priority target. However, because of the extreme success of antisubmarine warfare at sea, submarines were soon dropped from first priority, and the German aircraft industry became the number one target, with ball bearing and important aircraft components as secondary targets. Attacks on aircraft industries and oil reduced the German capacity to wage aerial war, and air superiority for the Allies was the ultimate outcome.

The German anti-friction bearing industry was outstandingly vulnerable to air attacks because it possessed "bottleneck" characteristics, and 76 per cent of the total production could be eliminated by destruction of the targets selected. These factories were heavily defended, and the magnitude of Allied losses, as compared to results could not be justified. Operations, therefore were suspended until bombers could be escorted farther into German territory. The Germans made full use of this respite to disperse and restore the industry, and consequently complete examination of available records showed no evidence that the attacks on the ball bearing industry had any measurable effect on essential war production.

The next phase in strategic bombing was a shift to marshalling yards and bridges in France in preparation for the invasion, which was in turn followed by the campaign against oil production.

By this time Allied bombers were escorted by fighters throughout their entire missions, and fighter pilots were instructed to drive the *Luftwaffe* from the air at every opportunity.

The German oil supply was critical throughout the war, and was the principal

factor controlling German military operations. Oil targets selected included synthetic oil plants in Germany and the Ploesti refineries, which together produced 50 per cent of the total German production. Attacks on oil factories were most suc-

sharply felt by all the German armed forces. Their operations were limited on all fronts.

The attack on transportation was a decisive blow which completed the disorganization of German economy by reducing



This benzine plant at Bottrop, Germany, was Germany's largest producer of airplane fuel before it was destroyed by aerial bombing. Camouflage netting was still in place when the plant was seized by the 79th Division.—US Army photo.

cessful, the Germans viewing them as catastrophic, and our continued attacks had disastrous effects. After May 1944, consumption of oil exceeded production, and by December 1944, fuel shortages were

war production, restricting movements of vital supplies, and limiting the tactical mobility of the German army. Prior to September 1944, no serious effects were noticed. Thereafter, heavier attacks pro-

gressively deteriorated their transportation net, and by March 1945 it was completely disorganized.

It must be remembered that the Allied strategic air effort did not begin on the desired large-scale, but built up slowly from a very small beginning. It is highly significant that of all the bombs dropped 83 per cent fell after 1 January 1944 and 72 per cent after 1 July 1944.

This briefly covers the approach used in the strategic air operations of Europe. In the Pacific, the processes of selecting the targets to be attacked would be found to be much the same. Of course, the actual bombing of the individual targets presented a slightly different problem.

At this time it might be well to bring up the old question of using strategic air power in a tactical role. The effects of strategic bombing on the tactical plan have already been discussed, but as far as using strategic air power in direct support of tactical operations, it must be remembered that it is seldom used in this role. Strategic air forces are neither designed nor equipped to be effective and efficient in such operations, and should be called upon only as an emergency last resort measure to save friendly ground forces, or when its use in supporting tactical operations will be of a campaign-winning nature. There are certain classic examples of its use in this manner. To name a few, there is *Operation Cobra* in the Normandy campaign. There is *Operation Queen* in the central Germany campaign and others. Note that they are all of a campaign-winning nature. These are some of the many ways in which strategic air power was employed in addition to its primary mission. However, it is most important

that its primary mission not be overlooked nor forgotten.

In getting back to the primary role of strategic air operations, one might do well to focus his attention upon the "United States Strategic Bombing Survey Summary Report of the Pacific War," which poses a question containing much food for thought.

"Does the existence of atomic bombs invalidate all conclusions relative to air power based on pre-atomic experience? It is the survey's opinion that many of the pre-existing yardsticks are revolutionized, but that certain of the more basic principles and relationships remain. The atomic bomb, in its present state of development, raises the destructive power of a single bomber by a factor of somewhere between 50 to 250 times, depending upon the nature and size of the target. The capacity to destroy, given control of the air and an adequate supply of atomic bombs, is beyond question. Unless both of these conditions are met, however, any attempt to produce decisive results in war through atomic bombing may encounter problems similar to those encountered in conventional bombing. The problem of control of the air, primarily of our own air—and should we be attacked, of the enemy's air as well—becomes of even greater significance. Given an adequate supply of atomic bombs, the B-29s based in the Marianas had sufficient strength to have effectively destroyed in a single day every Japanese city with a population in excess of 30,000 people."

This certainly brings one face to face with the fact that the ultimate objective of air power is to force the capitulation of an enemy nation by air action applied directly against the vital points of its national structure.

AN INTRODUCTION to MILITARY GEOGRAPHY

Part II

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Part I of this article appeared in the February issue of the MILITARY REVIEW.—The Editor.

Mediterranean Scrub Forest Lands Group III

THE unique character of this group depends upon a peculiarity of climate, that is, the summer drought and the winter rain. The typical Mediterranean climate consists of a hot summer with brilliant sunshine and clear skies, and a mild winter with irregular rainy periods.

The summers resemble those of the deserts. The strong wind raises heavy clouds of dust. Temperatures are high, except near the coasts. Frosts in winter are rare, but cause great damage because of their infrequency, not their severity.

These unusual climatic conditions support a scrub forest peculiarly adapted to the varying drought and humidity. Throughout the group certain common characteristics are apparent. Because of the mild temperatures there is no period of rest for the vegetation, consequently there is no time when all the leaves drop from the trees. New growth occurs in the fall and reproduction in the spring at the two ends of the rainy season. Low bushes

are common as the chaparral of North America, the maquis of France or the macchia of Italy. Grasses are rare because of the density of the shrub undergrowth.

The Mediterranean group of lands is found on the west coasts of the continents between 30° and 40° north and south latitude. Of the five areas in the world, the largest borders the Mediterranean Sea, extending from Portugal and Morocco in the west to Palestine and parts of the Black Sea to the east. In North America the area extends from Vancouver to Los Angeles. In South America a part of Chile, from Coquimbo to Concepcion, is of this group. A small area around Cape Town in South Africa and two small areas in Australia, near Perth and Adelaide, comprise the remainder.

Landsapes of this group usually are associated with the mountains and the sea. Only in South Africa and Australia are the high mountains lacking. In southwest Australia even hills are absent.

The presence of the mountains complicates military operations, particularly when the ranges are of such an elevation that they remain snow-covered throughout the winters. River floods are common throughout the lands of this group. The sparse grasses combined with cutover

In this second article on military geography, the author continues the discussion of the major land areas of the Earth, and emphasizes the importance of studying the broad aspects of these large areas

slopes permit rapid run-off of precipitation, with severe accompanying erosion. Stream valleys are steep-sided, and in combination with the threat of winter and spring floods, bridging operations are difficult. During the dry season, the heat and dust cause considerable physical discomfort. Mechanical equipment must be protected.

Modern development of lands of this group has progressed far beyond that of either the drylands or the tropical forest lands. Transportation facilities are generally adequate to support large scale military operations, except in the mountains. In such areas specially trained troops and specially designed equipment may be required.

As in the tropics, conservation of health may constitute a distinct problem. Malaria is wide-spread, particularly in the area of the Mediterranean Sea.

Tactically, irrigation canals will present obstacles to vehicular traffic. In addition, terraced slopes and the ever-present vineyard may serve to canalize cross-country movement.

The Mediterranean Basin was the habitat of the earliest civilizations. The Greeks believed the colder lands to their north were fit only for the barbarians, not civilized man. Today, those areas disdained by the Greeks have become the center of our "western civilization." This area is of the fourth group, the mid-latitude mixed forest lands.

Mid-Latitude Mixed Forest Lands Group IV

Two-fifths of the world's population is found in the lands of this group. The world's two great civilizations, oriental and occidental, have rather effectively removed the natural forest cover and replaced it with cropland and industrial complexes. Only in the more remote areas or in rugged highlands does the forest cover remain intact.

The climates of this group of land areas are intermediate between the tropics, which have no winters, and the more northern lands which have very severe winters. Variations of temperature cause a marked rhythm of the seasons, particularly noticeable in the vegetation. Generally these lands have mild to cold, but not severe, winters and warm to hot summers. As mentioned previously under climate, maritime climates have a lesser range of temperatures than the interior or continental climates. The position of a locality with respect to the coasts or interiors is responsible for the wide limits of summer and winter temperatures.

Except in the monsoon lands of Asia, moisture is abundant throughout the year. Even in the monsoon areas the heavy rains of summer accentuate the rhythm imposed by the cold season, instead of neutralizing the winter rhythm as in the case of the Mediterranean climate.

The original, virgin forest cover of this area consisted of coniferous trees and broadleaf trees in great variety. Generally speaking, when conditions of soil and climate are favorable, deciduous trees dominate. In areas of poorer soils and under the influence of a more rigorous climate, deciduous trees give way to coniferous.

Transition from the vegetation of the tropical forest lands to the mid-latitude mixed forest lands is gradual, influenced chiefly by temperature.

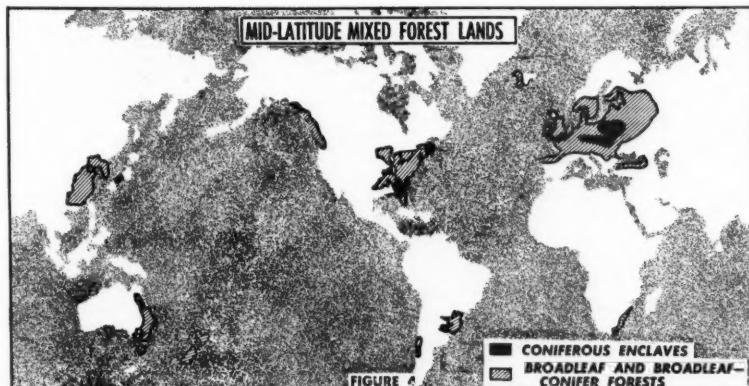
The lands of this group are found on the eastern and western sides of the continents, poleward of the deserts and grasslands. Where mountains border the seas, as in Norway, British Columbia and Alaska, Southern Chile or New Zealand, only a narrow strip exists along the coasts and the lower slopes of the mountains. Where mountain ranges do not complicate the eastern movement of weather, these forests extend far inland. In Europe, south of the Baltic, this forest extends

eastward as far as Moscow. In North America, east of the deserts and grasslands, this forest group is found between the lands of the tropical forests and the Boreal forests. That is, roughly east of the Mississippi River between 25° and 45° north latitude. South America possesses only a small area in southern Brazil which can properly be included in this group. The area is still smaller in Africa, consisting of a short narrow strip on the southeast tip of the continent. New Zealand, exclusive of the higher mountains, and the eastern border of Australia, also belong to this group. Japan, which cli-

have been fought in lands of this group. Our modern tactics, techniques and technologies are based on these historic experiences. No problem of terrain or climate has been left unrecognized.

Great systems of transportation have been developed to move raw materials, foodstuffs and manufactured articles. Military operations in such areas have available the means to move troops, supplies and equipment.

Movement cross-country will be perhaps the greatest single problem from the viewpoint of utilization of the terrain. Determination of soil types through recogni-



matically belongs in this group, is included among the mountain lands because of the ruggedness of its mountains and the small extent of its plains (Figure 4).

As mentioned earlier, most of the original vegetation has been removed to permit cultivation of the soil. The landscape is generally alternating cultivated fields and woods, particularly on rougher ground or poorer soils. All of the varieties of relief, plains, plateau, hills and hilly uplands, except the high, rugged mountains, are common to this group.

Historically the world's great wars

tion of vegetation provides perhaps the easiest solution to the problem of "soil trafficability." The association of coniferous trees with sandy soil, either well or poorly drained, or with the thin soil of steep hill sides, should be remembered. Similarly certain crops, as potatoes and barley, are planted on those soils which cannot support wheat or corn. Cultivated land will be muddy when wet, possibly impassable to vehicles. The areas supporting conifers, except in low areas, are ordinarily well drained and support traffic better when wet than when dry.

The Grasslands Group V

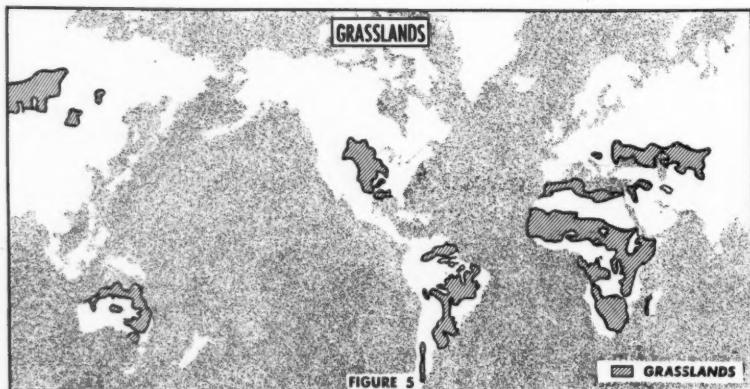
About 20 per cent of the world's land surface has a natural vegetation cover of grass. The vegetation type is traditional, as are the climatic conditions. Temperatures are similar to those in adjacent areas, either desert or forest. The determining factor is moisture.

Precipitation in the grasslands is greater than in the drylands, but insufficient, either in quantity or distribution, to support the forest trees.

As would be expected from the foregoing, the grasslands are found between the drylands and the forests. The transi-

The third type of grassland is the savannah which is found on the warmer fringes of the tropical forests. The savannah, too, is transitional. Trees line the stream courses. Thinly scattered trees dot the landscape, relieving the monotony characteristic of the steppe and prairie landscape.

In Eurasia the steppes extend from the western side of the Black Sea eastward beyond Lake Balkhash, with two small areas in Manchuria and Mongolia. In North Africa a narrow band lies between the mountains or desert and the sea. In North America the steppe exists on the north and east of the drylands from Texas



tional aspect of the climate is reflected by transitional vegetation types.

On the fringes of the drylands in regions of semi-aridity are the steppes. Steppe grasses are but a few inches in height, the root systems are shallow. As available moisture increases, the short grasses of the steppes are replaced by the tall, deep-rooted prairie grasses. Trees exist, as in the steppes, but only along streams. These two types of grassland are found along the cooler fringes of the deserts and forests.

to Canada. In South America, a narrow strip is found in Patagonia and parts of the Argentine pampas. South Africa has no true steppe. The basins of the Murray and Darling Rivers of Australia are steppe lands (Figure 5).

Prairies are found in the middle west of the United States and southern Canada; the northeastern part of the Argentine pampas and Uruguay. A small area exists in South Africa. The Hungarian Plain and much of the Ukraine are prairie.

The largest areas of savannah exist in

Africa, between the deserts and the tropical forest areas. The north coast of Australia, the Brazilian Plateau, the Llanos of the Orinoco River and the Gran Chaco are all of much less extent.

Most of the grasslands of the world are developed on relatively level surfaces, either plains or plateaus. The view is monotonous. In those rare cases where the land is rolling, the wide valleys have tree-bordered streams. These streams have proved attractive to settlers. The semi-aridity of the area has made the search for a constant supply of water of paramount importance.

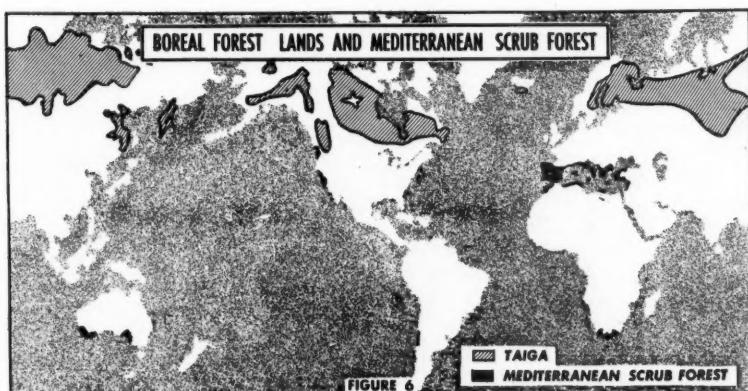
The yearly accumulation of humus

The economic importance of denying to the enemy the harvest of grain must not be overlooked.

Roads and railroads generally radiate from the important marketing centers in great webs of straight lines. The level terrain has simplified the construction of these facilities. Movement of great quantities of supplies is common to the existing economy. The logistical demands of war should be easily met.

The Boreal Forest Lands Group VI

These forests extend from west to east across the continents of the Northern



from the dying grass stems has given the grasslands some of the world's most fertile soils. Today these lands, particularly of the steppe and prairie variety, are the leading surplus food-producing areas. Grains and meats for urban populations are made possible by the rich soils of the grasslands.

The extensive cultivation of these areas is of importance to projected military operations. The rich, deep soil is sticky, clinging mud when wet. Movement cross-country in the rainy seasons (normally spring and early summer) will be difficult.

Hemisphere, north of the deserts, grasslands and mixed forests. Climatic conditions are not favorable to the broadleaf species, so here the coniferous species lack the competition which crowds them out in lands farther south. This forest is called "taiga" from the Russian name for the northern virgin forest (Figure 6).

Temperature is the most significant element of the climate. Winters are long, dark and severe. Summers are short, cool, but with long hours of sunshine. As noted previously, interior areas of the continents

experience temperature extremes. This is particularly marked in the Boreal forest lands. Verkhoyansk, the coldest spot on earth, is in the midst of the "taiga." Precipitation, except along the coasts, is low, generally less than ten inches, most of which falls as rain in the summer. The common belief that Siberia is hidden under deep snows is quite erroneous. Seldom is the snow more than three to four feet deep on the level. The winds may sweep the ground bare, piling great drifts when an obstruction is met.

Frost goes deep. In some areas the soil is permanently frozen to depths of a hundred or more feet. In other areas great expanses of swampland are found. Travel over such areas is virtually impossible except in the winter when the ground is frozen.

There are three types of land forms in this group. Hilly uplands on crystalline rocks are found on the Laurentian, Baltic, and Siberian shields of North America and Eurasia. Bordering these uplands are vast plains drained by north-flowing rivers such as the Mackenzie, Ob and Yenisei. Plateaus of moderate elevation comprise the third type. East of the Yenisei River the Siberian Uplands extend across Bering Sea to the Yukon Plateau of Alaska.

Former glaciation of the Pleistocene period has left many thousands of lakes, large and small. In Finland, for example, more than thirty-five thousand lakes are found. Such lakes in summer provide easy access to the wilderness areas by means of float-equipped airplanes. Equipped with skis these same planes use the frozen lakes in winter as landing areas.

Military operations in these regions are complicated by the cold of winter, the insects of summer, and the swamps. Roads and railroads are few and inadequate. Movement of supplies and military forces would have to depend on the great rivers and lakes. The reliable means are water-borne transportation in summer or air-

borne with float or ski-equipped planes in summer and winter.

Problems of winter warfare and measures to combat the severity of the winters have been studied in the past few years by our military forces. The results of the detailed studies may indicate more clearly how to overcome these obstacles.

The Polar Lands Group VII

These lands are distinguished by cold, even in the summer, and a sparse vegetation or no vegetation at all. The Polar regions are deserts in that they lack a cover of vegetation. Generally precipitation is light and the areas are sparsely settled.

These lands lie on the poleward side of the "taiga." The limits follow closely the limits of those areas whose average temperature of the warmest month is less than 50°. In fact, most modern geographers use this 50° isotherm as the boundary of the polar regions. Temperatures below this 50° do not permit the growth of trees. The vegetation of the polar regions is called tundra. Transitional types exist, as temperatures decrease. The bush tundra is found at the fringes of the "taiga," consisting of dwarf trees, chiefly ash, willow, birch and alder. Farther north the low shrubs disappear and the grass tundra of sedges, mosses and lichens cover the ground. Still farther north the continuous cover disappears. Patches of bare rock are interrupted in low sheltered places by the continuance of the grass tundra. This latter condition is known as the desert tundra.

The tundra exists on a permanently frozen subsoil named the "permafrost." The thaws of summer soften the surface but the water does not drain away. This soggy, spongy condition of the ground makes travel all but impossible.

In the south polar regions there is no tundra. There are only ice and restricted areas of bare rock. The climatic bound-

ary, the 50° isotherm, surrounds the Antarctic Continent, far at sea. In fact, this boundary roughly corresponds to 50° South Latitude. This is a distance from the equator equal to that of Cherbourg, Prague, Vancouver and the mouth of the Saint Lawrence River.

In the Northern Hemisphere the Polar regions lie generally north of the Arctic Circle in Eurasia. In North America, a line drawn from Bering Strait to the mouth of James Bay and the northern tip of Newfoundland would roughly define the limits. All of Greenland and the northern edge of Iceland are included in this group.

as much because of the bulkiness of the protective clothing as from the physical shock of the cold itself. Individual survival demands most of the energy and mental effort.

Mechanical equipment does not withstand extremely low temperatures any better than does the human body. For example, to start an airplane engine in Arctic weather a small heater warms the equipment which in turn warms the engine sufficiently to permit starting. Even jet engines require a period of pre-heating before it is safe to start the turbines which run at high temperatures.

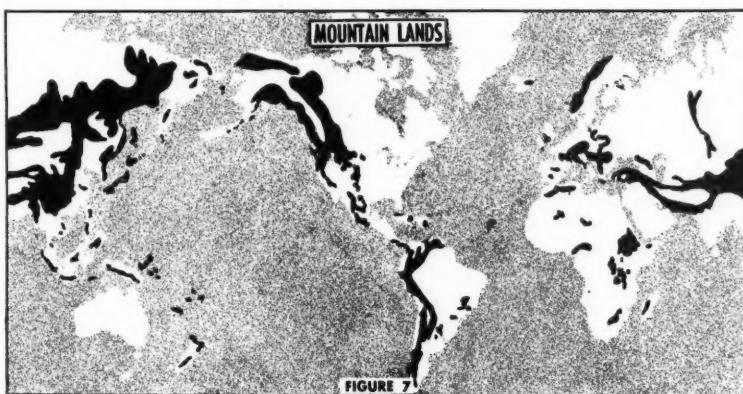


FIGURE 7

The surface features include all varieties of relief from low, swampy, coastal plains to high ice plateaus and glaciated mountains. Weathering of the rock is chiefly by force, the disintegration of frost and cold. This results in angular fracture of the rock with the eventual reduction to coarse, sharp-edged gravel. Erosion is chiefly through glacial action.

Military operations for larger troop units are probably impracticable. The countryside can furnish nothing. No transportation facilities exist. Low temperatures must constantly be fought. Physical efficiency drops rapidly below minus 20°

Operation *High-jump*, the Navy's expedition of 1946-1947 to the Antarctic, is the largest test to date of men and equipment. Yet all of the personnel who took part would not equal the strength of an infantry division. Of these, the majority were required for maintenance of the operation.

Military operations in Polar regions will be primarily defensive, such as manning outposts and weather stations.

Our experiences in Arctic operations have been extremely limited. Attu and Adak are actually nearer the equator than is Liverpool. Operations in Alaska and

the Aleutians are properly classified as sub-Arctic as these areas fall within the area of the Boreal Forest Lands.

The Mountain Lands Group VIII

The mountain lands are defined as areas in which relief is sufficiently marked as to cause a vertical differentiation in the vegetation cover.

These lands differ from the other seven groups in many important ways. In the first place mountain lands are recognized by configuration, not vegetation types. Vertical ascent or descent—not south or north travel—reveals major vegetation differences. Another feature is the intricacy of distribution. Mountain landscapes are spotty, each bit contrasting sharply with neighboring small units. Another characteristic, important to the military geographer, is the difficulty of movement on steep slopes and across the rugged surfaces. Mountains are historically-proved barriers to the spread of plants, animals, man and ideas (Figure 7).

The mountain lands of the world seem to radiate from the Tibetan Plateau in Asia. Only a few more or less isolated mountain areas exist which are detached from this system. Various fascinating speculations have been advanced by geologists to account for the formation of mountains and their subsequent history of erosion to the forms known today.

These forms display the resistant qualities of the rocks from which the mountains were formed. The ridges, the canyons, the cliffs, the valleys are each evidence of the processes of erosion. The resultant land forms give character to the landscape. Beauty or a spectacular view, however, is most apt to indicate difficulty for military operations.

Rugged relief, with steep slopes, results in swift streams. The slopes themselves often forbid the movement of mechanized means of transportation. The inaccessibility of mountain areas is reflected in the lack of roads and railroads. Such as exist will be found where low passes or gaps across the ranges have made construction cheaper or easier. Canalization of traffic with the attendant danger of attack must be accepted. The heights must be controlled to permit use of the corridors.

In those areas where the mountain heights reach into regions of eternal snow, climatic conditions approach those found in the Boreal Forests or Polar regions. In low latitudes (0° to 15°) this zone of permanent snow appears above 12,000 to 14,000 feet. In the middle latitudes (15° to 45°) it exists above 9,000 to 11,000 feet. Operations in these areas must be planned especially to cope with climatic conditions of low temperatures and permanent fields of ice and snow.

Military Geography

The student of military geography must see the broad picture. He must guard constantly against becoming so immersed in details of individual features that he misses the significance of the large regions. Some of the regions discussed are hospitable, and possess facilities which would assist military operations. Other regions have not yet been fully settled or exploited. In the latter regions particularly, military operations can be successfully conducted only when the region as a whole is understood. When the factors that inhibit their occupation by man are better known, then military planning can proceed with confidence that no problem of logistics, operations or survival can arise unexpectedly.

MILITARY NOTES



BELGIUM

Congo Base

Construction of a military base in the Belgian Congo will be started in 1949.

The base will include a training air field, a repair base for fighter planes, a pilots' school, a technical school for Negro soldiers and a drill field. It will take four years to build the base.

The base is regarded as the nucleus of possibly more important military establishments to be created later in Belgium's African colony.

The Belgian Congo is the world's biggest producer of uranium ore. The proposed military base will be established miles away from the uranium mines of Shinkolobwe in the southern part of the Congo.—News report.

AUSTRALIA

Anti-Invasion Exercises

What were described as the first anti-invasion air exercises ever to be carried out by the Royal Australian Air Force were held in the Darwin area last July. The object was to establish, at short notice, a forward operations base. The operations included a search over the sea near Darwin for "enemy" convoys, and high-altitude bombing on targets in the Northern Territory.—*Journal of the Royal United Service Institution*.

ARGENTINA

New Pay Scale

The new pay scale for the armed forces, which became effective last July as a result of the high cost of living, has been the subject of various commentaries by some of the newspapers in Washington. It is stated by these newspapers that Argentina has now the best paid army in the world. The base pay of an Argentine officer is higher than that of a US Army officer holding the corresponding grade. With the new pay scale, Argentine generals and admirals receive higher salaries than the majority of the industrial executives in the United States.

It is said that if a computation is made based on the official exchange rate—480 Argentine pesos for each one hundred dollars—the monthly officers' pay would range from \$177 to \$936. Additional pay is authorized for service in isolated bases, mountain service, flying duty, submarine service, etc.

In the new scale, a second lieutenant's pay is less than that of his equivalent in the US Armed Forces, and a first lieutenant's pay is just a little more than that of the latter. In this respect, it has been learned that political leaders are also considering raising the pay of personnel in the lower grades.—*Revista de la Fuerza Aerea, Chile*.

USSR

Increasing Army Strength

In the Soviet Union, much industry is engaged in producing armament. On Soviet Air Force Day in July 1948, the Minister of the Armed Forces declared that the aviation industry had developed multi-motored planes and jet aircraft. The manufacture of tanks is also being carried out on a large scale. At least 200,000 workers are employed in the tank manufacturing industry, exclusive of the tank-motor industry. The Soviet Union is able to produce from 45 to 50 thousand tanks per year. By using all the reserve tank factories, it is claimed that yearly production could be raised to 60,000 tanks. The tendency is toward construction of lighter, hence faster, models possessing considerable fire power. The present standard models are the improved T-34 of about 30 tons and the reinforced *Stalin* type of 54 tons. Both types are provided with a long-tube gun which is not under 12.8-cm caliber. An effort is being made to improve tank radio equipment, which even in World War II was outmoded. All tanks are provided with a special, non-magnetic outer-covering as a protection against magnetic charges. Since gasoline requirements for tank formations are enormous, the Russian oil industry is also being rapidly and extensively developed.—*Allgemeine Schweizerische Militär Zeitschrift*, Switzerland.

New Chief of Staff

The Moscow radio announced recently that Marshal Alexander M. Vasilevsky has been relieved as Army Chief of Staff. He has been succeeded by Sergie Matveyevitch Shtemanko, formerly Assistant Chief of the General Staff. The broadcast said that Marshal Vasilevsky's work as Chief of Staff and First Deputy Minister of the Armed Forces had become "excessive." He will retain the latter post.—*The New York Times*.

MEXICO

National Defense

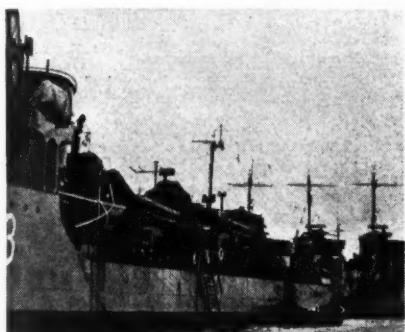
The Secretary of National Defense of the Republic of Mexico recently presented the President a report covering the activities of his department from 1 September 1941 to 31 August 1948. Among the outstanding activities included in the report are:

1. The establishment of an NCO School whose principal aim is the training of capable personnel to form and maintain the necessary NCO cadre in the organization of units, the Air Staff courses, command groups, and physical education instruction.
2. The continuation of the recruitment program through the combined employment of conscription and voluntary enlistments.
3. The successful completion of maneuvers, usual daily exercises, and drills by the Corps of Presidential Guards, military schools and Divisions I, II and III.
4. Under the construction program, 5,326,000.00 pesos have been spent up to date.
5. The following important works have been undertaken: Residential zone of Military Camp No. 1 costing approximately 70 million pesos, which will house 15,000 persons; the Army base of Santa Lucia, which will be one of the most important in Latin America; the Army Air base of Guadalajara; a cavalry post under construction in the Bajío area, where a group of cavalry regiments will be assembled for better instruction and preparation; construction of a new building for the Military College in Hacienda de San Mateo.
6. The lowering of the illiteracy rate among army personnel is being carried out with excellent results through the cooperation of the Civil Administration Campaign.—*Revista del Colegio Militar*, Mexico.

GREAT BRITAIN

Reserve Fleet

Just as in the United States, the British are placing a large part of their wartime naval strength on the inactive list. Valuable equipment on the inactivated ships is being protected by the air-tight "cocooning" process.—*The Illustrated London News*.



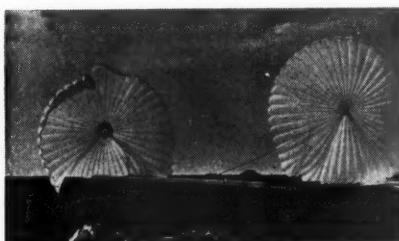
British destroyers in reserve near Plymouth.

All-Weather Flying

The Air Ministry is converting the Royal Air Force into an all-weather flying force, capable of operating under any conditions. An Assistant Directorate of Training (All-Weather Flying) has been formed under the Assistant Chief of Air Staff (Training) to act as a focal point where questions of training and equipment development will be studied. An all-weather research squadron has been formed as an integral part of the Empire Flying School at Hullavington, Wiltshire. To insure that training keeps abreast of technical developments, close contact will be maintained with other organizations engaged in research on instruments and radio aids to all-weather flying.—*Journal of the Royal United Service Institution*.

Dropping Heavy Equipment

British airborne forces recently demonstrated a new method of dropping heavy equipment by parachute. The device used is called a universal container. The equip-



Above, the universal container immediately after landing; below, driving a jeep and trailer away from the container.



ment is loaded into the container and attached to a large aircraft, taken to the drop zone and released. Large parachutes lower it to the ground where airborne forces previously landed open the container and use the equipment.—*The Illustrated London News*.

African Army

To offset the loss of the Indian Army of 2,000,000 men, the Chief of the Imperial General Staff has drafted plans for raising a great fighting force in Britain's possessions in Africa.—*United States Naval Institute Proceedings*.

GERMANY

German Turbojet

The Jumo-004 jet-propulsion gas turbine was the first operational German turbojet engine. It went into large-scale production in the spring of 1944. Some 6,000 units were produced before the German collapse. Most of them went into the 550-mph twin-jet Me-262, the only jet fighter



Jumo-004 jet engine.

used in substantial numbers during the war on either side.

Static sea level thrust of the Jumo-004B was 1,975 pounds at 8,700 revolutions per minute. Service life was very short, owing to lack of heat-resistant metals. Later engines of this type are now being used in some of the new Russian jet fighters.—*Aero Digest*.

FRANCE

Combined Staff

The Council of Ministers has set up a Combined General Staff of the Armed Forces which will consist of the Chiefs of Staff of the Navy, Army, and Air Force. They will consider jointly problems involving all three services. General Lecheres, Chief of Air Staff, has been appointed to head this body.—*Journal of the Royal United Service Institution*.

Air Transit Agreement

An Air Transit Agreement was signed between Britain and France recently. Under the terms of this agreement military aircraft of both countries operating on specified routes may fly over the territory of either country and land for repairs or refuelling at certain air fields.—*Journal of the Royal United Service Institution*.

The Inspector General

The powers of the Inspector General of the French Army, heretofore not well defined, have been modified and extended.

Army inspectors are placed under the Inspector General's direct authority, and their reports must possess his signature. He exercises permanent supervision over the general training of the Army, and studies and transmits to the War Ministry decisions relating particularly to the training of troops and cadres, the operation of military schools, and the advanced military instruction and training of the ground forces.

All plans for the training or organization of the Army must be transmitted to the Inspector General by the Chief of Staff, and he is particularly consulted on plans involving assignments of personnel for school and military instruction centers.—*L'Armée Francaise*.

UNITED STATES

Ship to Test Rockets

The Navy disclosed recently that it has a sea-going rocket laboratory from which 14-ton V-2 missiles could be sent aloft.

The vessel, the converted seaplane ten-



Norton Sound, Navy sea-going rocket laboratory, with helicopter platform in foreground.—US Navy photo.

der *Norton Sound*, will have the basic mission of widening the horizon of upper atmosphere research through rocket firing experiments conducted at sea in safe, isolated areas at various latitudes, extending from the equator to the polar regions, that are not feasible for land tests.

The *Norton Sound* is the first Navy ship specifically equipped for the main purpose of firing big rockets. Besides handling the German V-2, she can fire the *Aerobee*, an experimental American rocket for high-altitude research, and launch balloons for cosmic-ray research in the upper atmosphere.

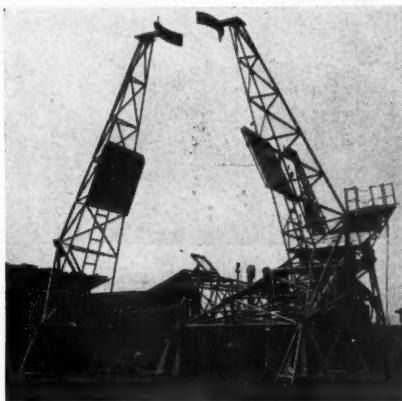
The *Norton Sound* is not a fighting ship, the Navy stressed, but a floating laboratory for the use of the Army and Air Force as well.

Scientists at White Sands, New Mexico, where nearly all the V-2 firings have been held, have wanted a longer range to see what distance they could get.

Because of neighboring communities, they have had to fire the V-2s straight up to altitudes of 114 miles. They would like to gain additional information shooting them horizontally.

The main changes made in the vessel included a metal deck sheathing to withstand the heat of the rockets, a helicopter landing platform forward, storage tanks for rocket fuels, and special fire-fighting and damage control equipment.

The *Norton Sound* will carry elaborate electronic equipment to track rockets in flight and high-speed cameras for close study of the takeoffs. The helicopter will be used to recover recording instruments in floatable compartments expelled from the



Special rocket launching racks on the after deck of the *Norton Sound*, for test firing 14-ton missiles.—US Navy photo.

rocket at the end of its flight. Bright dyes will mark the water around these compartments for easier spotting from the air.—*The New York Times*.

Protection for Fire-Fighters

The Air Matériel Command has developed a light-weight suit of fire-fighting clothes made of aluminum foil laminated to a cotton backing. The suit employs the principle of heat reflection and is for use by fire fighters who are exposed to very high degrees of heat; it is not to be worn into the flames.

Material in the foil laminate weighs approximately three pounds, and the entire suit, complete with helmet, weighs



Foil laminate fire-fighting suit.—Air Matériel Command photo.

under eight pounds. It consists of trousers, zippered jacket, the foil-covered rigid helmet, gauntlets, and spats zippered over ordinary rubber overshoes.

The eyepiece in the helmet is made of high heat resistant glass onto which gold has been evaporated and the whole laminated with vinyl resin. It will withstand over 2,000 pounds of shock and 2,000 degrees of heat.—Air Matériel Command, Department of the Air Force.

Service Function Mergers

The Secretary of Defense recently authorized the creation of a Weapons Systems Evaluation Group in the National Military Establishment, and announced that the Navy will take over all Army sea transport now handled by the Transportation Corps.

He also made public a plan for joint use of recruiting facilities and services by the Army, Navy, and Air Force, and signed a new regulation providing for unified accreditation for press correspondents serving outside the United States in areas under the jurisdiction of the armed services.

The purpose of the Weapons Systems Evaluation Group is to provide rigorous, unprejudiced, and independent analyses and evaluations of present and future weapons systems under probable future combat conditions, prepared by the ablest professional minds, both military and civilian, and by the most advanced analytical methods. The Group will make comprehensive analyses and evaluations under projected conditions of war at the request of the Secretary of Defense, the Joint Chiefs of Staff, or the Research and Development Board.

Request analyses and evaluations will take precedence over those initiated by the Group. The findings and conclusions of the Group will be only advisory, and will not be binding on any group or agency of the National Military Establishment. The Group may obtain information and advice, in connection with its studies, from other agencies within or outside of the Military Establishment.

The consolidation of all sea transport service will require some time. The possibility of placing all land transportation under the direction of the Army is being explored, but, the Secretary pointed out, this would not include actual operation of transport systems, but only transportation priorities.—*Armed Force*.

Mine Disposal on West Coast

Since the end of the war, hundreds of Japanese mines have drifted into the vicinity of the US West Coast. Most have been sighted at sea and destroyed, but many of them have drifted onto the beaches, presenting an ever-present danger to persons in those areas.

The 13th Naval District, which controls Oregon and Washington Naval activities, has organized a special mine disposal unit headed by Lt. (jg) Devon F. Winslow, USN, to handle the disposition of such mines as might drift into its sector.

Lt. Winslow, especially trained as a mine disposal officer in this country and in England, worked at Pearl Harbor after the Japanese raid clearing up unexploded bombs, torpedoes, and ammunition. Later, he worked in other Pacific areas during the war, practicing his speciality which is recognized as one of the most dangerous occupations performed by man.

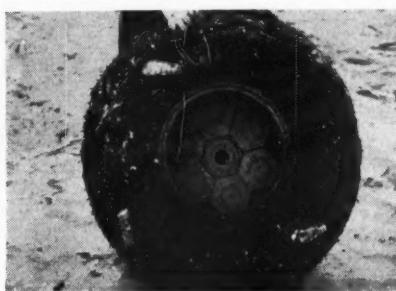
Since the war, Lt. Winslow has been stationed in the 13th Naval District where he has exploded or rendered harmless 57 mines.

In the course of a recent operation, Lt. Winslow discovered new safety devices not previously found on Japanese mines. This particular mine, incorporating a new type base plate, is far more sensitive to work than any other previously encountered. Because of its importance, the new mine was sent to Washington for further study.

In all, up to 17 May 1948, 117 mines had been located, either at sea or on the Oregon-Washington beaches. Most of the mines were Japanese but many American mines planted in Japanese water during the war also were moved by the Japanese Current into continental United States waters. Time and the effects of sea water disarm many of the mines, but enough still remain active to make the mine disposal officer's job exciting.—Department of the Navy.



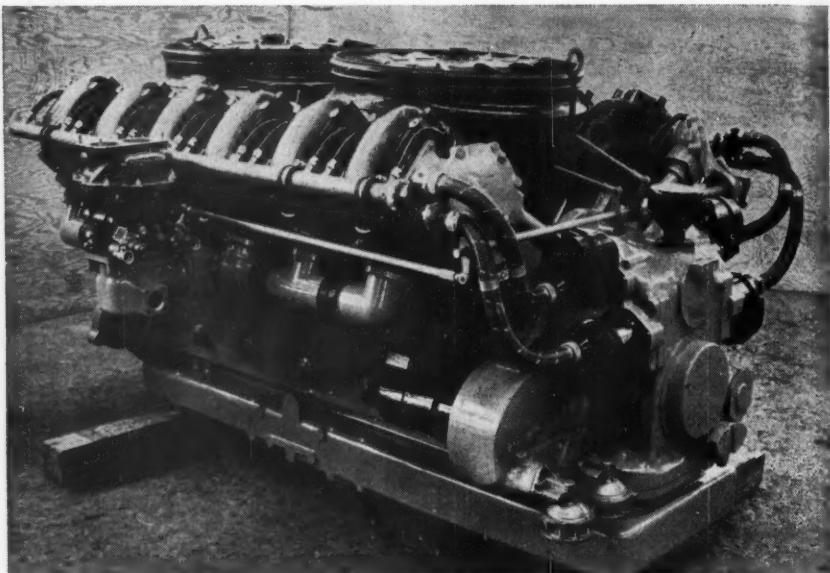
Japanese type 93 mine, washed ashore at Bay City, Washington, ready for disposal by the 13th Naval District.



Above, Japanese type C mine, containing new safety devices; below, exploding a mine far from any inhabited area.



Air-Cooled Engine



The new 810 hp air-cooled engine used to power the M-46 General Patton tank.—US Army photo.

A new line of heavy-duty air-cooled engines for use in military vehicles was announced recently by Continental Motors Corporation. The six models range from 125 to 1,040 horsepower.

As these power plants do not require radiators, water pumps and other cooling accessories, their lightness in weight and compactness is particularly adaptable for military vehicles where payload and cargo space are important factors.

Sub Radar Service

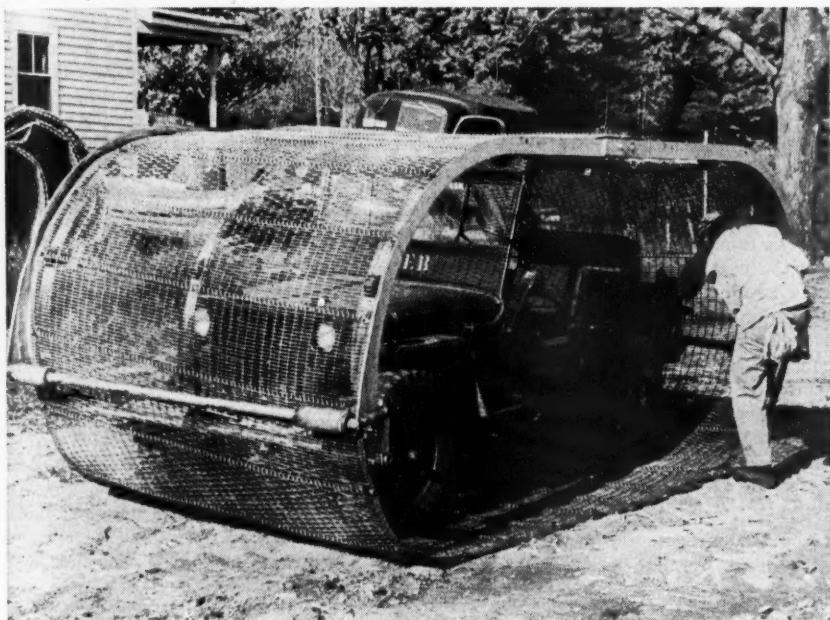
The first of two submarines to be converted for radar picket service, the *USS Tigrone*, was placed in commission from the Reserve Fleet in November, 1948. Prior to the conversion, the vessel was a part of the New London group of the Atlantic Reserve Fleet.—*Armed Force*.

Another feature is the simplicity of design and interchangeability of parts (MILITARY REVIEW, July, 1947, p. 72) which assures quick mass production and facilitates repairs and maintenance.

There are only two basic cylinders of 4 $\frac{1}{2}$ and 5 $\frac{1}{2}$ inch diameter and increased power is obtained by increasing the number of cylinders and by stepping up the compression ratio in the basic cylinder models.—*The New York Times*.

Weather Station

The Signal Corps has developed an automatic weather station to replace manned stations where maintenance of observers is impractical or impossible. Data obtained is converted to Morse code and radioed to a central collection point.—Department of the Army.

"Squirrel Cage" for Jeeps

For driving over swamps, pot holes, bogs, soft beaches, and heavy underbrush, the Marines have developed what they call a "squirrel cage" for their jeeps. It is a continuous road matting which runs under the wheels of the vehicle and then back over the top, providing a continuous portable road surface wherever the jeep goes.—US Marine Corps photo.

Tanks Reconditioned

War-battered tanks from battlefields all over the world are getting a complete face lifting in a new program designed to build up America's armored forces.

The tanks are sent to the Army's Detroit Arsenal production plant, and rebuilt down to the last bolt.

A production rate of about 50 a month will be reached soon. By this summer the rate will be increased to approximately 15 per cent of the plant's wartime potential.—*Ordnance*.

Pay Commission Reports

The Secretary of Defense recently made public a unanimous report of his Advisory Commission on Service Pay which recommends a constructive revision of the pay structure for the uniformed forces of the United States, together with a readjusted program for retirement and allied benefits.

The over-all effect of the recommendations on the active duty payrolls of the military services is estimated to average an increase of about 15 per cent.—National Military Establishment.

Defense Pact

The Treaty of Rio de Janeiro, binding nations of the Western Hemisphere to mutual defense against any and all aggression, became operative 3 December 1948.

It went into effect at an historic ceremony at which Costa Rica deposited her papers of ratification before an assembly of officials and diplomats of the Western world. Costa Rica was the 14th of 21 States to present her ratification, meeting the two-thirds requirement to put into action the pact that seeks to end neutrality anywhere in the Hemisphere when aggression is on the March. Activation of this pact, worked out after 19 days of negotiation in Rio de Janeiro in August and September 1947, concededly presented a working pattern for negotiations for a mutual agreement that would span the Atlantic.—*The New York Times*.

Industrial Preparedness

The Under Secretary of the Navy revealed recently that, prior to 1 August 1948, a total of 399 plants built by the government during World War II at a cost of more than \$6,000,000,000 have been preserved for defense purposes.

Most of the plants have been sold or leased to private industry under the protection of the National Security Clause, which provides for their rapid conversion to military production in case of war.

In addition to these complete plants, the government has retained a part interest in 79 other so-called "scrambled plants," which cost approximately \$400,000,000.

Looking toward the future, the Secretary said the Munitions Board, of which he is a member, is preparing a single and uniform Armed Services Catalogue which should eliminate about half of the five million munitions items covered in the project, and a common procurement manual.—*Armed Force*.

Continental Air Command

The United States Air Force recently began organization of a Continental Air Command (CAC) designed to strengthen the Air National Guard and the Air Reserve programs in line with a recent executive order and to provide for Air Force command areas identical with those of the Department of the Army.

The Continental Air Command will include all the units and functions now assigned to the Air Defense Command and the Tactical Air Command, which will continue as operational headquarters under CAC at their present locations.

Under the new organization, CAC will assume direct control over six regional Air Forces to which all units and stations presently assigned to the Air Defense Command and the Tactical Air Command will be transferred. Each of those Air Forces will be responsible for Air Force matters within the identical limits served by each of the six Department of the Army areas so that the services may have closer coordination. The plan was drawn up by mutual agreement between the Department of the Air Force and the Department of the Army.

The Continental Air Command will have its headquarters at Mitchell Air Force Base, New York. Through it the Air Force will be able to throw the full weight of the combined units either to the Air Defense Command or to the Tactical Air Command as circumstances may require. This will provide for speedy cooperation with the Army and Navy under possible future contingencies.

The following Air Force and Army areas will have identical geographical limits:

The First Army and 1st Air Force.

The Second Army and 14th Air Force.

The Third Army and 9th Air Force.

The Fourth Army and 12th Air Force.

The Fifth Army and 10th Air Force.

The Sixth Army and 4th Air Force.—Department of the Air Force.



FOREIGN MILITARY DIGESTS

The Nuremberg Trials

Digested by the MILITARY REVIEW from a lecture by Sir David Maxwell Fyfe
published in "The Journal of the Royal Artillery" (Great Britain) July 1948.

AT the close of World War II we had a very grave problem as to how we were to deal with the major Nazi war criminals. Apart from the fact that over ten million people had been killed in battle—which one might well expect in a world war—in the last war some twelve million men, women and children were killed in cold blood and some seven million had been taken into slavery.

The Allied governments, as early as 1943, set up the machinery for investigating and getting evidence of these crimes and the leaders of the Allied governments had promised, in the Moscow Declaration, that those criminals whose deeds had no special geographical location, would be punished.

The end of the war came and the question arose as to what we were to do. First, we could do nothing at all, and let them go; we could deal with them by executive action, as the Allies dealt with Napoleon 130 years before; or we could try them.

Reasons for Trial

Now there are a lot of people who thought that executive action was the best way of dealing with them. There were many people who thought that a fair trial

was impossible where so many people had formed a personal judgment and that political actions were not a proper subject for judicial decision.

Well, I would like just to tell you what influenced my mind. In the first place, executive action is not nearly so simple as it sounds. Someone has got to make the decision as to which persons are going to be punished and which persons are not, and also a decision as to those who are going to be killed and those who are going to be imprisoned. I suppose at that time, as Attorney General, from the British point of view a good deal of the decision would have had to be made by myself. What I should have been doing—if it had been taken out of my hands and given to the Commanders in Chief, what they would have been doing—would have been to perform what is essentially a judicial function—that is to say, deciding who is going to be punished—behind closed doors, without anyone knowing the reasons that operated in their minds and without the focusing of public opinion upon the steps that they were taking. Apart from that, I hoped that after this war, as after every war, there would be a general desire for greater justice between

nations, and I thought it was a bad thing to start off the formation of that desire by refusing to adopt the methods of justice in the first task presented to one.

I had two further reasons which I think were important. A large number of people, even those who had been actively engaged in the war, thought that a great many of the stories about the Nazis were merely propaganda myths which had been colored in order to create a proper state of morale during the war. It was most important that that should be put right. Finally, on the longer view, there have been no better apologists in the past than German professors, and I wanted these apologists of the future to be confronted with an impregnable fortification of truth. For those reasons I was in favor of a trial, and my American, Russian, and French colleagues at the International Conference, of which I was chairman, took the same view.

The Question of Law

The other point of view is the question of the law we administered. I was constantly asked: "Are we inventing law to fit the crime, or are you proceeding on established law?" The answer is emphatically that in my opinion we were proceeding on established law. The most discussed of our charges was that of preparing and waging aggressive war. I want just to indicate to you why I believe that was an international crime. International crimes are not and cannot be made by statutes. There is no international legislating body. They are made by agreement between Sovereign States and in 1928, in the Briand-Kellogg Pact, a vast number of nations, including Germany, renounced aggressive war as an instrument of policy. By so doing they made it an international evil. They put it in the category of international crimes and produced this difference, that aggressive war ceased to be something which was only paid for by reparation between States: It became a

crime for which individuals were responsible.

War Crimes

The second category of charges were war crimes. These had been established as crimes for centuries. Certain laws and usages of war which ought not to be broken have been known for hundreds of years, and the Hague Convention of 1907 only codified understanding of those laws and usages of war which had existed in the past. The second charge was breaches of these laws and usages of war. The third category was crimes against humanity, and although that sounds a bit far-flung when you hear it said, what it meant in fact was acts which would be regarded as criminal by the criminal law of any civilized State and which had been committed in order either to assist aggressive war or to assist the perpetration of war crimes.

That was the general basis on which we proceeded, and I should like now to turn to a point which I am sure has occurred to many: "If you charge people with crimes of that sort, did not we do much the same?" Taking it broadly, there is all the distinction in the world, in my view, between the crimes which an army commits in hot blood and the Nazi technique. The difference in the Nazi technique was that it raised inhumanity to a principle and it made atrocities a calculated instrument of conquest, and it went beyond even what I have now stated because one of the main objects of the war as it developed was what we call the crime of genocide. That is, the elimination of a racial or national group as such. It was not a question of killing six million Jews or killing a large number of Jews: It was eliminating Jewry as a body from Europe. That was the object from 1941 onwards. When Colonel Horst said that he had done away with two and one-half million Jews in Auschwitz he was not describing the murder of a large number of individual

people. He was describing a step in the policy of the elimination of Jews as a national group. In the same way, with regard to Poland, when Hitler, Bormann and certain others met just after the Russian campaign had started, they drafted a plan by which Poland was to be destroyed as a nation; the intelligentsia were to be eliminated. All those who could hand on the tradition of the country and the language of the country were to be destroyed.

Keitel's Case

Now if I might pass to the Service Departments themselves, I will take the case of Keitel and deal with that in a little detail, and then just indicate how the others fall into the same categories of crimes. The position of Keitel was that he was head of the *Oberkommando Wehrmacht*. That was an Inter-Services Group which really acted as Hitler's military Chancellery. It had the advantages of Inter-Services cooperation. It had the great disadvantage that there was no political figure to urge its views on grand strategy to Hitler. Keitel fell into the position, although he was Field Marshal quite soon in the war, of being rather a Service secretary to Hitler without the actual power of a Minister and although it ill-becomes a politician to urge even the necessity or the advantages of a Minister to soldiers when the point comes of convincing one politician of the rightness or wrongness of any strategical ideas that he has in time of war, it is almost a necessity, and certainly an advantage, that you should have someone who is able, from his position, to put unpopular and unpalatable views strongly before a man of great personality, and it is right to say that the set-up which Hitler adopted in 1938 had that great disadvantage of Keitel not being able to make his views felt. That was the position, and under him was Jodl, who was the Chief of his Operational Section, and although under

Keitel he reported direct to Hitler any operational matters.

Let us just consider of what Keitel was convicted and, in outline, the evidence on which these convictions were made. He was convicted of preparing aggressive war and waging aggressive war, of war crimes and of crimes against humanity. I would like to try to put it quite objectively, first to indicate the evidence on which he was convicted of the first category of crimes against peace. He was in on every one of the aggressive activities of the Hitler of the Third Reich. He started with Austria. Some of you may know that room in the Berghoff at Berchtesgaden. That is where he had his interview with Schuschnigg before the *Anschluss*. In that interview, after the pressure had been applied as to the invasion of Austria if his terms were not accepted, the psychological moment came when Hitler flung open the door and called Keitel, and Keitel jumped in and stood to attention, personifying the readiness of the *Wehrmacht* to go into Austria.

So I want you to get the psychological background first. It is not a question of someone being outside the plans. These men were right in the center of the plans. A very good example of that is the Green Plan for the invasion of Czechoslovakia, because the *Wehrmacht* had that plan constructed on the basis that D-day should be fixed by an incident in Czechoslovakia against Germany, and the incident which attracted them as being a good one for fixing D-day was the murder of the German ambassador. That is, they arranged that their own ambassador should be murdered—in good flying weather—in order that there should be a D-day for the campaign. I think you will agree that that is going beyond any plans for which one would normally be responsible in his military career. The same broadly applied with regard to the White Plan for Poland, and Norway, in which the plans were

placed under Keitel's direct and personal guidance. With regard to the Netherlands, Hitler declared on 23 May 1939 that he would ignore the neutrality of Belgium. The same applied with regard to Greece and Yugoslavia in 1941, when Keitel accepted that the complete occupation of Greece was a prerequisite to the settlement, and he accepted Hitler's view that the destruction of Yugoslavia should take place with unmerciful harshness including, of course, the unannounced bombing of Belgrade. Keitel said that he was opposed to the invasion of the Soviet Union because he thought it would constitute a violation of the German-Russian non-aggression pact, and he not only was opposed to it but he said (and I have no reason to disbelieve him) that he put in a memorandum against it to Ribbentrop, who forwarded it to Hitler. But all these men were conscious of the position. Once Hitler had said that the matter must go on, in von Brauchitsch's words, there was nothing more to be said, and they all agreed and willingly took part. In a short time Keitel was not only ordering the Army to be ready to march but ordering it to carry out the economic directives of Goering.

Therefore, in this case, you have the first point which one must face, that henceforward, if a general is conscious that the plans are the actual and practical plans for aggressive war, he becomes criminally liable if he takes part; but you have, in practically all of the plans which the Nazi war criminals took part in, an element of wrongful and illegal method which adds something more to the question of aggressive war. I do not want in any way to shelve that issue, and I do not want you to be misled about it. It has changed the position of, at any rate, a high military commander on the question of aggressive war, that if with knowledge he joins in the practical and immediate preparation of such a war,

he is committing an international crime. There is no doubt that places him in a difficult situation, but it is only by placing people in difficult situations that progress is made towards what is generally considered a better view. I wanted to make that clear because the Nazi military commanders were all guilty of war crimes and in most cases crimes against humanity at the same time. So that from the broad moral point of view, as opposed to the point of view of international law, one can console one's self, if one has any doubts, that these men were all found guilty, on very good evidence, of what is nothing else than murder. It is no less murder because you procure someone else to fire the gun. As early as 12 September 1939, Keitel told Colonel Lahousen (as he then was) who was Canaris's third in command of the Security Service of the *Wehrmacht*, that Polish intelligentsia and Jews were to be liquidated. I find it impossible, judging military tradition as fairly as I can, to justify the head of the High Command of the *Wehrmacht* being party to orders for the liquidation of intelligentsia not for war crimes but simply for political purposes. On 13 May, Keitel produced an order that civilians suspected of offenses (suspected of offenses!) should be shot without trial, and that the prosecution of German soldiers for offenses against civilians in occupied countries was unnecessary. In September 1941—that is, three months after the invasion—the *Oberkommando Wehrmacht* issued its ruthless regulations for the treatment of Russian prisoners of war; and the interesting point there was that on the original document which I had to consider, Canaris, who was head of the *Abwehr*, wrote to Keitel that under international law (that is, under the common law of decency between fighting forces whether they were part of the Geneva Convention or anything else) it was impossible and wrong to hand over your prisoners of war to the

Schutzstaffeln (a section of the *Sicherheitsdienst*) for liquidation. Keitel wrote on that document, with his own sort of purple pencil he used: "These objections arose from the military concept of chivalrous warfare. This is a destruction of ideology. Therefore, I approve and back the measures." That was for deliberate ill-treatment of prisoners of war, and

hostages to execute when German soldiers were attacked. On 7 December he signed the *Nacht und Nebel* Decree—the Night and Fog Decree—that in occupied territories civilians accused of crimes of resistance should be tried only if death sentences were likely; otherwise they should be handed to the *Gestapo* and taken to Germany in such a way that their



The 21 defendants in the war crimes trial at Nuremberg, Germany, listen intently as the final statements are read to the court, October, 1946.—US Army photo.

various of them being shot by the *Schutzstaffeln*. That again is indefensible. A few days later he ordered that attacks on soldiers should be met by putting to death 50 to 100 Communists for each German soldier. Again, I think that is indefensible. There might be some discussion as to how far you could go, but to kill 50 to 100 people collected merely from the nearest village for one soldier is to my mind simple murder. On 1 October—that is, a fortnight later—he ordered military commanders always to have

friends and relatives would know nothing about them.

Keitel said later that he was concerned about the actions he had done, and I asked him when I was cross-examining him what were the things about which he was mainly concerned, and he said: "The shooting of your Air Force officers, the Commissars Decree, the *Nacht und Nebel* Decree and the Commando Order." The Commando Order came out on 18 October 1942 and in practice it meant that anyone operating in groups of ten or less were to be handed

over to the SS or SD and shot out of hand, whether they had uniforms or not. Keitel passed on that order. He said that Hitler had started it; but he sent it forth. He later extended it to Allied Missions with partisans. He said he did not believe the order was legal, but he claimed he could not stop Hitler from decreeing it.

The special example which I put to him was two of our people who went out with a torpedo in a canoe to try to torpedo the *Tirpitz*. The attempt failed and they were handed over to the SD and shot. I said to Keitel: "What, in the name of any military tradition you like, were these fellows doing that was wrong?" He said: "Sir David, I cannot see it; they were not doing anything different from a fighter" (to use his own language) "that tried to bomb the ship." One felt strongly about these matters and so I put to him: "You were wearing the boots of Blucher and von Molke, holding a great military tradition in your hands. Why did you not protest and stop it?" His answer was "Well, I suppose I was weak—I could not."

Jodl's Case

With regard to Jodl, he was the originator of D-day for the Czechoslovakian campaign, and was generally in the center of the plans in some way, and he, again, prepared the order. The argument is always put against my point of view that he was only Chief of Operations, and everyone has to prepare orders for something or another; but when Jodl was preparing orders for the invasion of the Soviet Union, the Commissar Order for liquidating Russian Commissars was a directive in that case. It included these suggestions. The decision whether they should be killed without trial was to be made by an officer. That makes it quite clear that there was no question of hot blood. It was a decision which was to be made by an officer. Then the draft contains, in Jodl's handwriting, the suggestion that this should be handled as retaliation. Here was

a deliberate part of the campaign, that Communist politicians should be liquidated, but there is added to that the suggestion that it should be handled as retaliation—a clear inference, I think, that they knew quite well what they were doing was wrong.

The early drafts of the Commando Order was made by Jodl's staff. He got out the covering memorandum to commanding officers and again he says that he was opposed on moral and legal grounds, but he could not refuse to pass it on, and he again took part in the extension of the orders, after the Normandy landings, so that it would apply to any of our people operating in small bodies behind their lines in Normandy, which does, I think you will agree, seem a quite incomprehensible extension of the order.

The other point about Jodl was that he became party to, and took his part in, securing enemy slave labor for work on the Atlantic Defenses and in Germany, which is, of course, a clear and obvious war crime, because the law prevents you so using the populations of occupied territories. Again, to get the background, when Hitler was considering, early in 1945, denouncing the Geneva Convention about prisoners of war, Jodl's answer explained his view. He told Hitler that adherence to the Convention would not interfere with the conduct of the war—for example, sinking a British hospital ship as a reprisal and calling it a mistake. Again I think you will see the attitude, and I am trying to give you, quite fairly, the mental attitude which was behind these orders. This was not a question of saying "I adhere to these things and I am forced to carry them out," but it was a question, in almost every case, of the officer applying his mind to the policy which these orders were intended to express.

I hope I have put it fairly to you. On the one hand you have this new problem of aggressive war; on the other hand you

have got the fact that all of these Service chiefs were connected with and responsible to a great degree for orders that were really orders for murder.

The Charge

Now I would like to conclude by reading to you the way that I put it at Nuremberg, which I hope, if it does not command your acquiescence, may, at any rate, command your thought:

"The men involved have joined in wars which they knew were unjust wars of aggression. They have borne essential parts in the deeds which in the hands of their immediate perpetrators are undeniably war crimes and crimes against humanity. Yet they protest their innocence. Our case against them has as clear a basis on the facts of this case as in the lessons of victory. They carried out orders which on the admission of many of them bit deep into the remnants of their consciences. They knew that they were doing what was wrong, but they now say an order is an order. All decent men find it difficult to blame others for absence of moral courage—they are only too conscious of their own failings in that direction. But there comes a point when, faced with crimes which are obvious murder or barbarity, there is a higher duty. Even Dr. Laternser (Counsel for the High Command) admitted this was so. His suggestion to the witness Schreiber that he ought to have protested at the Army Staff's proposals for bacteriological warfare came strangely on behalf of these men whose very defense had been to declare the impossibility and uselessness of protest. What nonsense—what utter nonsense—is this which you have been asked to listen to by these defendants and their generals when their own counsel, to discredit a witness, must ask the very question which the prosecution have been asking of themselves since the day this trial began. In fairness to all military tradition it should not go forth that

soldiers have sheltered behind the letter of a command from facing moral problems—and deciding them, rightly or wrongly, as moral problems. Great captains are not automata to be weighed against a rubber stamp. I need not traverse the history of our own military figures—the philosophy of Montrose, the brooding thoughts of Marshal Ney, the troubled heart of Robert E. Lee in 1861, to find examples. Two of the greatest names in German military history spring to one's mind: von Clausewitz leaving the Prussian Army to serve in that of Russia; York von Wartemburg making his decision of neutrality—both put what they deemed the needs of Europe and humanity above the order of the moment. How much more clear and obvious was the duty when the work of drafting, issuing and carrying out the *Nacht und Nebel* Decree, the Commando Order, the Commissar Order and Hitler's Order to murder the fifty Air Force officers, meant the defiling of every idea which every soldier cherishes and holds dear; when—as all of them who ever served upon the Eastern Front could see with their own eyes—they were asked to support and cooperate in a calculated system of mass extermination and utter brutality. These men, of all men, knew their leader to be a callous murderer, yet for years they had met in conference after conference to sit at his feet and listen to his words. They fed his lust for power and enslavement with the best of their professional skill. While the defenseless peoples of the East, the men, women and children of Poland, of the Soviet Union and of the Baltic States were being deliberately slaughtered and deported into slavery to allow for German *Lebensraum* these men talked of the necessities of war. When their own cities were bombed and Germans killed, they called it murder. Only in July 1944 when Hitler's star was dimmed did three field marshals and five colonel generals recognize that he was murdering also their own country and take

action. When that star was rising in victory they had hailed it and ignored the blood-red color of the clouds from which it rose."

That was the view that I formed. I do

recognize, as a lawyer, the difficulties which it involves, but I am certain that unless we can progress to these standards then it is indeed hopeless for the future of the world.

Early Convoys to Russia

Digested by the MILITARY REVIEW from an article by Commander J. Grant in "The Fighting Forces" (Great Britain) August 1948.

ON the seas, the saga of the convoys to Russia abounds with incidents in which the convoys concerned ought to have suffered far heavier casualties than they did. And if this is true of most convoys to Russia, it was particularly so in the early days, when only a relatively weak escort and support force could be provided for them.

The Route

During 1941 and the first half of 1942 the convoys ran between Iceland and the Kola Inlet (Murmansk). Later, Archangel became the terminal point. They were liable to attack by heavy units, destroyers, and torpedo and bombing aircraft based in Norway, in addition to the U-boat.

In summer the lack of any dark hours helped the Germans, and in the spring the southerly drift of the ice-floes brought the route closer to the Norwegian coast. Things in winter were equally bad for both sides.

The Close Escort

The convoy close escort was provided by the Western Approaches Command and consisted of old destroyers (including an occasional ex-American), corvettes and trawlers. These ships, being primarily anti-submarine, were relatively weakly armed against aircraft and surface ships. The destroyers had had half their gun armament and all control equipment removed, while the corvettes had only one 4-inch gun.

The weight and space gained were given over to anti-submarine weapons and equipment.

The Home Fleet's Task

Owing to the potential scale of attack, and the weakness of the close escort, except in an anti-submarine capacity, a covering force with reasonable surface and antiaircraft gun power was very necessary. This commitment was met by the Home Fleet, based on Scapa Flow.

It was, however, not only the convoys to Russia which were threatened by German heavy units based on Norway or elsewhere in the North Sea theater. This threat extended to the Atlantic, in which the *Graf Spee*, *Scharnhorst*, *Gneisenau* and *Bismarck* had all had a run. In this respect, therefore, the Home Fleet had the dual task of covering these convoys and of preventing a break-out of potential raiders into the Western Ocean.

This split aim directly affected the dispositions of the Fleet and resulted in a reluctance during the early days to spare more than a token force to cover the convoys to Russia throughout their trip.

It is true that the Fleet usually carried out a sweep during part of the time that a convoy was at sea, but the need to guard the gates of the Atlantic kept them well to the south of the North Cape, and a convoy attacked in that area could look for help only from its "all the way" escort.

Enemy's Delayed Reaction

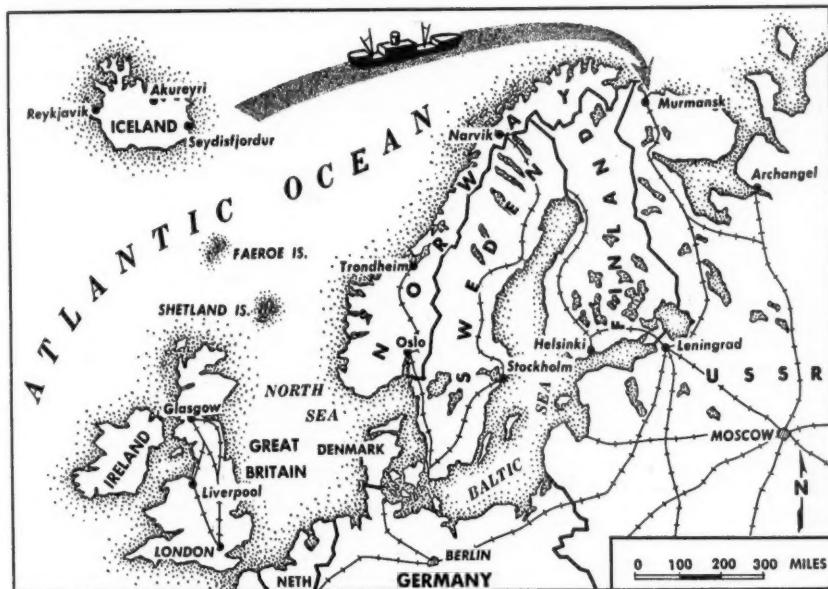
The first convoy sailed in August 1941, and throughout the remainder of that year and the first few months of 1942 the scale of attack was very light. Only one ship was lost during this period.

In March 1942, the *Tirpitz* was located off Trondheim by a submarine and later attacked by torpedo aircraft from the *Vic-*

only one merchant ship was lost during each trip, when, by all the rules, a far greater number should have been sent to the bottom. The period covered is April and May 1942, in the opening phase of the German offensive.

The Outward-Bound Convoy

The close escort of the outward-bound (PQ) convoy, comprising the destroyers



torious, but no definite results were achieved.

This incident heralded the opening of an air and sea offensive of ever-growing intensity against these convoys, in which heavy losses were suffered by both sides, though, on the whole, the losses inflicted upon the merchant ships in convoy were surprisingly small.

The following account of the passages of one of the earlier outward and homeward bound convoys is remarkable in that

Bulldog, *Beagle*, and *Amazon*, the ex-American destroyer *Beverly*, and some corvettes and trawlers, assembled at Seydisfjordur, on the east coast of Iceland, where they were joined by the support force from the Home Fleet.

Only one cruiser, the *Edinburgh*, and the destroyers *Foresight* and *Forester* could be spared as "through" support on this occasion, and, in particular, the lack of an aircraft carrier was keenly felt.

The convoy assembly point was

Akureyri, on the north coast of Iceland, and the convoy was met at sea by its escort and support force soon after clearing.

The southerly drift of the ice at that time of year meant that the route had to pass south of Bear Island and far enough south to be clear of a possible mine field in the shallow water near the island. The difficulty of dodging the Germans once they had located the convoy was added to the total absence of dark hours.

The start of the third day brought the first German shadowing aircraft, and the convoy settled down to fight its way through between the ice to the north and the attacks from the Norwegian coast. The U-boat had to be contended with throughout the voyage.

The first and only casualty which this convoy suffered occurred during the following afternoon, when the Commodore's ship blew up and sank. She was heavily laden with tanks and guns and, apparently, a certain amount of ammunition.

This surprise attack went unavenged, as a search by the escort produced no result. It may possibly have been a very long-range shot, but a U-boat may well have passed undetected through the screen, which can never be "watertight" round a convoy.

After this success the U-boats began to show themselves and at dawn the following day four were sighted on the surface within five miles of the convoy. They were hunted by escorts, but with no definite evidence of success. The U-boats in the deep field were having it all their own way owing to the convoy's lack of air support. The absence of aircraft enabled them to reach attacking positions ahead of the convoy by proceeding at high speed on the surface out of range of attack by the close escort.

However, for some unexplained reason, no further submarine attacks were made and the stage was left free for the tor-

pedo and bombing aircraft, who timed their arrival to coincide with a dense fog. They could be heard cruising overhead searching for a clear patch, or for a mast or funnel protruding above the fog, an unpleasant experience for those beneath, as no retaliation was possible, but the fates were against them.

The fog cleared before long, but evidently the Germans considered that they had done all that was demanded by their High Command and they did not put in another appearance during the voyage.

By this time two Russian destroyers and four British minesweepers from the Kola Inlet had joined the escort. The Russian destroyers were Italian-built and appeared to be good ships. They were well handled by the Russians, if somewhat imprudently at times.

At Murmansk

If the last few days of the outward journey were peaceful, this could not be said of the twelve days spent in the Kola Inlet while the convoy was unloading.

The Germans kept up a constant succession of air raids and, though they achieved little success, they were of considerable nuisance value.

The Russians were able to put up a remarkable volume of flak of all calibers. This they fired without any regard to the safety of their own fighters, which were mainly Russian-piloted *Hurricanes* and *Spitfires*.

The Return

The start of the return (OQ) convoy coincided with an unpleasant northerly gale and reports that ice had come yet farther south.

The cold at this time was intense and the spray appeared to freeze before it fell to the deck.

Ships became heavily encrusted with ice and this caused much anxiety not only because it rendered guns, torpedoes, depth charges, etc., immovable, but in the case

of the destroyers and corvettes the added top weight might have capsized them had it not been kept within limits. To keep the armament ready for action ice chipping operations had to be carried on almost continuously in small ships.

Except for a very brief escort by one or two Russian aircraft, with no satisfactory communication channel, the return convoy had no air escort, and the *Edinburgh* decided to proceed independently to the northward to locate the ice barrier.

This was an unfortunate decision, as some hours after she left she reported having been torpedoed and that her speed was reduced to three or four knots.

The two Home Fleet destroyers and the two Russian destroyers were sent to join her and for the remainder of the trip the convoy was without its support force.

The *Edinburgh* subsequently sank and the Fleet destroyers returned to Murmansk after an engagement in which the force sank a German destroyer.

At dawn two days after the torpedoing of the *Edinburgh* the convoy was attacked by a formation of about twelve torpedo aircraft. They dropped their torpedoes outside decisive range and scored no hits. This was another demonstration of the fact that, although a convoy may appear to be a fairly tight formation, there is a good deal more water than ship.

Air attacks could have been renewed with comparative impunity, as the convoy had no fighters and only a very moderate antiaircraft fire power. As in the case of the outward voyage, however, only one sortie was made by the Germans.

By noon that day the convoy was approaching the longitude of Bear Island. A destroyer suddenly made its appearance out of a patch of mist about five miles to the southward, followed by a second destroyer, and doubts as to whether these were the two Russians returning were soon dispelled by the appearance of a

third. The long-expected attack by surface forces was about to start.

At the time it was thought that these three were "Narviks," but it seems possible that one was of another class. The former mounted five 5.5-inch guns each, so that there were fourteen or fifteen against a total of eight smaller guns possessed by the four escort destroyers, who also lacked the advantage of modern control equipment.

The enemy opened with a torpedo attack and while the escort destroyers were joining the *Bulldog*, the smallest merchant ship in the convoy was struck and sank.

The *Bulldog* led out towards the Germans who were now in full view, and a fairly rapid if not very accurate fire was opened.

In contrast, the German director-controlled salvo flashes could be seen and soon the air was filled with the crack of exploding shells and whine of splinters. The German gunnery was excellent, with a small spread and perfect ranging.

The *Amazon* was hit in the bridge structure very early in the engagement and her after searchlight blown over the side, but she managed to stay in the line. Most ships sustained minor damage from splinters, and if the Germans had used more semi-armor-piercing shell they would probably have achieved more success.

After about ten to fifteen minutes the *Bulldog* ordered "make smoke" and the destroyers retired behind it to the convoy, which had altered course to the north and was entering a field of small icebergs.

When the smoke had cleared the Germans were seen to have turned into line abreast and to be closing for another attack. The *Bulldog* again led out towards them and the destroyers succeeded in driving them off after another ten to fifteen minutes, with more smoke to cover retirement on the convoy at the end.

By this time all forces were well into

the ice, the small bergs being a great hazard, and it is difficult to say whether the subsequent faint-heartedness displayed by the Germans was due to this or to the gunnery of the escort destroyers. They certainly kept up a rapid fire, but its accuracy cannot have been great owing to the lack of control equipment. The Germans ought to have been able to sink them and then have dealt with the convoy, but after two more attempts they made smoke and retired. They had attacked and been driven off four times in about four hours.

A remarkable feature of the battle was the sudden appearance near the convoy of a couple of U-boats on the surface who, unable to reach them with torpedoes owing to the ice, opened a brisk but ineffectual fire with their guns. They dived and retreated when attacked by the corvettes.

The remainder of the voyage to Iceland was completed without incident. The loss

to the convoy again amounted to only one ship.

Conclusion

If a moral can be drawn from the lack of persistence displayed by the Germans during the passages of these two convoys it is also worthy of note that this was another occasion on which a comparatively weak force, boldly handled, succeeded in driving off a force considerably stronger.

There are two well-known occasions in the Mediterranean when Admiral Vian, with a few ships with which he employed similar tactics, held the major part of the Italian Fleet at bay.

In a later convoy to Russia, also, a greatly superior force was held off by Captain Sherbrooke's few destroyers until they were relieved by the covering force.

All these engagements are further proof that the best method of defense is attack; particularly when the defending force is weak.

The High Command in Sweden

Translated and digested by the MILITARY REVIEW from an article by Capt. A. Küch in "Allgemeine Schweizerische Militär Zeitschrift" (Switzerland) August 1948.

IN connection with the revision of the regulations concerning the organization of the Swiss high command, it should be of interest to see how the problem of army command is solved in Sweden. Although the situations in Sweden and Switzerland are not entirely comparable, nevertheless various Swedish views can be of value to us. In 1936, the General Staff of the Armed Forces was made a permanent organization in Sweden, yet, according to the organization of that time, a Commander in Chief of the Armed Forces was to be appointed only on the outbreak of war. On 8 December 1939, not until after the war had begun it was decided that the Chief of the General Staff of the Armed Forces should become Commander in Chief.

The defense regulations which went into effect in 1942 also provided for the position of a Commander in Chief of the Armed Forces for the peacetime organization. He exercises the highest command in peace as well as in war. The General Staff of the Armed Forces, the commands of the Army, Navy, Air Forces, and various administrative authorities, are under his orders. Placed directly under the Commander in Chief of the Armed Forces are the Chief of the General Staff of the Armed Forces, the chiefs of the branches of the Armed Forces and the commanders of the seven military districts for matters pertaining to preparation for war, air defense, supply service, communications, and intelligence.

The organization plan in peacetime

is as follows: The Commander in Chief makes the main decisions as to war preparations, organization, training and equipment. The staff of the Armed Forces deals with strategic problems, in detail as regards the Army but only in general as regards the Navy and the Air Force.

In war, the operational units of the Army are placed directly under the Commander in Chief (not under the Chief of the Army) and the work is consequently concentrated in the Staff of the Armed Forces. The operational units of the Navy and Air Force are, as a rule, in wartime, under the Chief of the Navy and Chief of the Air Force, respectively, and only in rare cases directly under the Commander in Chief. As a result, the Navy and Air Force Staffs are operative staffs in contrast to the Army Staff. The Staff of the Armed Forces deals, furthermore, with the problems common to all three branches of the Armed Forces regarding air defense, communications, intelligence service, press service, motion pictures, etc. The Staffs of the three Armed Force branches deal with all the matters concerning personnel, organization, training and equipment, that is to say, the daily problems of peacetime.

This system appears to be satisfactory on the whole. The proposal for a new defense organization which appeared in November 1947 contains a plan for modification intended to create closer cooperation between the Commander in Chief and the Chiefs of the three branches of the Armed Forces. The following solution is proposed: For the highest command of the *defense organization in time of peace*, a special body, the so called "defense command," would be created, consisting of the Commander in Chief of the Armed Forces and the three Chiefs of the branches. The defense command would meet at least once a month and, in ad-

dition, would be called together as needed by the Commander in Chief. The Chiefs of the branches can also request meetings. The defense command deals with problems of basic importance, or of long range significance. The Commander in Chief directs the cooperation, and his decisions are final. Differing opinions of the other Chiefs are recorded in the minutes, and presented, when, as a result of the conference, the administration or the Ministry of Defense becomes concerned in the matter. It is also possible to call into the conferences the chief of staff of one of the branches of the Armed Forces, representatives of the research institution of the Armed Forces, and other administrative authorities.

Fundamentally, the Commander in Chief of the Armed Forces, as well as the Chief of Staff of the Armed Forces and its operation section, can be recruited from all three branches. However, in practice these three positions have, so far, always been filled by Army officers. The opinion has repeatedly been expressed that more officers of the Navy and Air Force should be called in.

The desirability of a defense counsel with the mission of insuring cooperation between the political and military leaders also has been much discussed. To it should belong, on the one hand, the ministers of the departments; on the other hand, the command of the Armed Forces and representatives of the air defense and the economic defense-preparedness. Although fundamentally the desirability of closer cooperation is stressed, nevertheless in Sweden the predominating opinion prevails that the necessary contact in each case can be made without formality.

In conclusion, attention is called to the fact that the proposal for the creation of a defense command in peacetime has not been dealt with by the Swedish Parliament.

The Soviet Air Force

Digested by the MILITARY REVIEW from an article in
"The Aeroplane" (Great Britain) 6 and 20 August 1948.

THE Soviet conception of air power is diametrically opposed to the British concept, in that there is no Soviet Air Force as such; almost all air units are directly under the army or navy. The majority of the air units come under direct army control. Furthermore, the air armies were used almost solely as instruments for the direct and immediate support of the land forces.

Whatever lessons have been taught by the last war they have made no difference to the broad policy of the Soviets to air power. As the Red Army grew in power and efficiency in the years between the two World Wars, so did the air squadrons, but always tied closely to the army. The progress of World War II did nothing to alter the original policy but, if anything, strengthened it. The successes of Anglo-American strategic bombing again had no effect on the Kremlin's policy. The end of World War II found Russia with a vastly more powerful air force than she had in 1939, but still her policy and aim remained unchanged. All air forces are divided between the army and the navy, the army having by far the greater proportion.

Army and Naval Air

The naval air forces were divided between the fleets of the Northern Seas, the Baltic Sea, the Black Sea, and the Pacific. The equipment of the naval forces was similar to the Army Air Forces, thus helping standardization and production, but at a sacrifice of operational efficiency. The military air forces were divided into Air Armies, the Long-Range Force and the Fighter Arm of the Air Defense Force. Of these the Air Armies were by far the most important, absorbing some 75 per cent of the total air strength of

Russia. They acted under the control of the Army Group Commanders and their sole purpose was to assist the operations of their groups.

The air armies were divided into fighter forces, ground-attack forces, and bomber forces, the fighters being the most numerous. The Long-Range Force, although independent in status, was in no way comparable with the Strategic Air Forces of England and America. Its equipment was the same as that of the Air Armies, and its function was more to assist specific offensives than to accomplish true strategic bombing. In spite of its name and independent status it should be regarded in the main organization as a reinforcement force for army groups.

Although the Russians were the first to experiment on a large scale with parachute troops, airborne forces did not figure largely in their organization. The broad picture, therefore, is one of a force designed and built up to work in close support of the land forces. Aircraft production was standardized for this main purpose and the airplanes designed for army work had to serve the needs of the navy as well.

Personnel and Training

During World War II, the Russian nations built up an air force over a million strong, and they managed to beat the highly trained and technical Germans. There are two main reasons for this. First, whatever we think about Communist teaching, it must be admitted that there has been a wider spread of general education than was achieved by the old regime. Second, the Soviet policy of farm mechanization on a grand scale has brought a rough understanding of mechanical devices to many millions of countrymen.

The average Russian is an intelligent man and he has a natural attraction towards things mechanical. He is keen to learn, inventive, yet good at imitation; as a soldier or airman he is determined, and not given to nerves. He is tough, both physically and mentally, and, once he is in a service he does not worry so much as we do about questions of family, property, or religion. He may lack initiative but he never criticizes an order—he just carries it out, provided the order is simple and he can understand it. Above all, he firmly believes his propaganda.

Fighter pilots were good flyers, excellent in individual combat, but weak in duties such as escort work. Ground-attack pilots also were skillful flyers, and stood up bravely to a casualty rate which gave ten sorties as an average expectation of life. Both types were apt to be brutal to their engines and consequently did not always get the best performance from their aircraft. Bomber, naval, and long-range flyers generally had a better technical understanding of their equipment but, compared with Western Allied standards, were weak in formation flying, navigation, and night flying. Bomb aimers were poorly trained and had inefficient equipment, but the standard for radio operators was good. Air gunners were courageous but often lacked weapon training and frequently wasted ammunition.

Education of ground personnel was low by our standards, but the individual was hard working and interested in his job. Discipline was good and excellent in hard conditions and the Russian capacity for working under terrible conditions was a large factor in the success of their air operations. Repair units were quite competent, but transport was handicapped by shortage of vehicles, although Russian vehicles proved excellent under bad conditions.

Training of pilots and air crew was on lines broadly similar to our own; pilots started at elementary flying training schools and then went on to service schools. The number of pupils at an elementary flying training school varied from 150 to 2,000, and the range of subjects taught was much the same as in our own schools, but included "political instruction." In the service schools pilots were given some seventy hours of flying and the course lasted seven to nine months, according to the weather and the student. Pilots selected for the Long-Range Force had a longer training of up to 120 hours and, although this force was rarely employed for strategic purposes, it did contain a nucleus from which a modern strategic force could be built.

Apart from the elementary flying training schools and the Operational Training Unit, the Russians established special advanced schools for the training of flight and squadron commanders, and there was also at least one Senior Air Combat School for fighter pilots, designed to put a final polish on experienced men. Towards the end of World War II, when the air forces had become strong, air armies were often sent many miles away to rear airfields to provide a rest from operations and give a polish to their training. Also, towards the end of 1943, all operational air regiments were provided with a couple of training aircraft. Pilots appointed to operational units could be tested and given further training if required, and a special officer was detailed for this work. This idea seems very sound.

Air training in the Soviet Union was fully adequate for Russian requirements. That the Soviet Air Force was able to rebuild and expand during the progress of a great war testifies to this.

By far the most outstanding characteristic of Soviet air training was its flexibility. The High Command was ever willing to shift the main effort of train-

ing from one type of training unit to another if such action was justified. These shifts were designed to meet pressing operational needs, and they invariably proved to have been made correctly.

The employment of badly-trained personnel in the first half of the war might appear without sense and purpose. However, only thus was it possible to keep the Soviet Air Force operational until better-trained personnel became available. The solution of the formidable problem of evacuating training stations from territory threatened by the Germans and of reopening them again in safe areas must be appreciated as brilliant. It is an example of Russian ability to accomplish much under highly adverse conditions.

By the middle of 1945 the Soviet Air Force and its affiliated services had grown to a strength of over one and a quarter million men.

Operational Efficiency and Tactics

At the start of World War II the Russians had an Air Force of considerable size but very low in efficiency. Most aircraft were obsolete, production facilities were limited, and designs were rarely original. In spite of continual improvement during the war, the Soviet Air Force was always inferior in equipment to that of the Germans and quality of equipment is a most powerful factor in all air warfare. Compared with their opponents, the Soviets were ill-equipped, badly-supplied, and inefficiently controlled, yet in the end they won the battles.

There are three main reasons to explain this apparent paradox. The first is that towards the end of the campaign the Russians were numerically superior to the Germans. Second, the airmen, fighting over their own country showed fanatical bravery and complete disregard of casualties. Third, Russian aircraft, although inferior to the German types in performance, were of simple design and consequently easily maintained by the rela-

tively ill-trained personnel; they were also, on the whole, suitable for the tactical methods employed.

At the start of the war, the Russians were not only unprepared but they made the mistake of deploying their Air Forces too far forward. In the retreat of 1941 they lost not only a large part of their operational strength but also much of their reserves, together with vast quantities of stores and supplies as well as certain factories. This forced the decision to transfer the aircraft factories to the Urals and to Siberia. The next year saw the Soviet Air Forces struggling against a vastly superior force, but building for 1943. From January 1943, to the end of the war, the SAF constantly increased, while that of the Germans decreased; by mid-1944, the German strength was so low that the Russians had almost complete air superiority.

The main aims of their air armies in attack were to destroy the German forward defense screen and smash his strong points. Their attention was then directed to armor or infantry disposed for support. These tasks came before attack on air fields or even the countering of enemy air activity, and took precedence over attacks on artillery, transport and main reserves. In defense, the air armies concentrated mainly on armor, infantry, field artillery, and immediate reserve formations.

Tactical surprise demands not only meticulous staff work, but often leads to complications not suited to the Russian mentality. Probably for this reason it was rarely attempted. The normal policy was to reduce frontline strength before a big offensive and to build up a reserve; the first phase started some three months in advance, involving continual air reconnaissance. Then came increased activity by the air forces against the enemy back areas, up to 120 miles behind the line. The third phase concentrated on transport and communication, and, in the last phase, the ground attack aircraft and

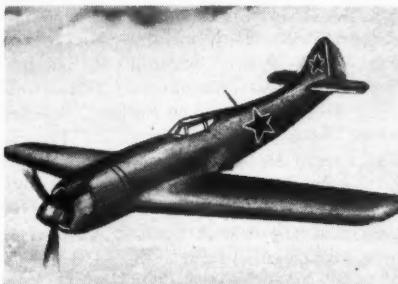
the bombers slacked off their operations in favor of intensified fighter activity. Finally came the offensive, with all aircraft helping tanks and infantry.

So much for the general tactical plan, but no rigid rules for the guidance of operations were laid down. Always the Russian staff was ready to improvise or alter plans as a result of war experience and, consequently, there was great flexibility in operational procedure.

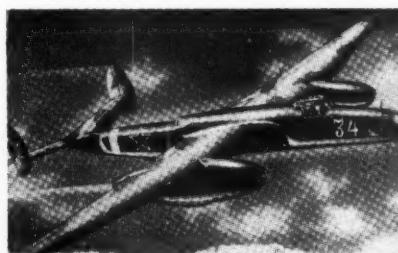
The fighter forces in particular were adept at improvisation and the correct exploitation of war experience. Their operations showed not only tactical flexibility but also ruthless and unorthodox employment of aircraft in abnormal roles. Their main tasks during an offensive consisted of patrolling the battle area and air fields, cooperation with infantry and tanks, and a certain amount of reconnaissance work, both visual and photographic. Patrol heights varied from 2,000 to 20,000 feet unless enemy bombers were expected, or there was bad weather. For escort work, fighters were split into two groups—one, the assault group, flying some three-quarters of a mile ahead of the bombers and about 200 feet above. The other group acted as close escort just behind and above the bombers.

Night-fighter tactics were crude and mainly depended on searchlights guiding the fighters into the defended area. After that they had to look after themselves, for there was little effective control from the ground. The artistic and complicated system of controlled interception used in Great Britain was being developed in the SAF, but had little use during the war.

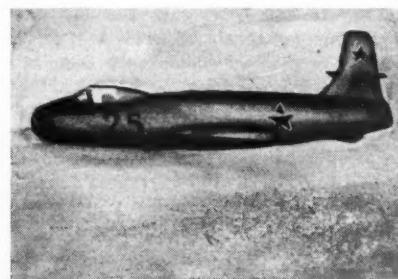
Ground-attack aircraft usually operated in formations of four in a blunt arrowhead. Early tactics were to approach at very low level, but later on the efficient German light *flak* forced up approach heights to between 2,500 and 8,000 feet. Bombs were dropped in a shallow dive at



Recent Soviet planes observed in service include the three shown here. Above, the La-9 observed in Central Germany.



Above, jet Tu-2 medium bomber, reported to have after-burners. Below, Thunderjet fighter, possibly of Yakovlev design.



below 500 feet, and aircraft broke away from the target individually.

Medium bombers usually worked in flights of three, with three flights making up a V formation at staggered altitude, and flying loosely before and after attacks, but in close formation over the target. Bombs were dropped from a shallow glide on the signal of the flight leader. Operations were frequently carried out at division strength with four, five, or even more, groups taking part.

The Long-Range Force (LRF) was in no way a strategical force like our own. Admittedly it carried out some minor and ineffective attacks against German towns in 1941 and 1942, and, in 1944, a series of raids were made on Finland with the idea of accelerating peace terms. All such raids were most unimpressive, both in plan and in execution.

For most of the time, the LRF operated within 120 miles of the front and its function was largely tactical. In spite of superior training the navigation of the LRF was weak and its instruments inefficient. However, at the end of the war improvements were being made and experimental work done with radar navigation. Tactics by day were similar to those of the bomber forces; by night the "stream" of bombers was mainly determined by the take-off times. Heights for night attack generally ranged from 10,000 to 16,000 feet and target marking was seldom used. Inefficient though it was, the operations of the LRF gave the Russians very valuable experience which will stand them in good stead should they decide to develop a strategic force.

The Soviet Naval Air Fleet had a better standard of education and training than the army because of less wastage. Their main handicap was the types of aircraft used, which, often being the same as those used by the Army, were unsuitable for naval work; tactical employment was on similar lines to that of the Army Air Forces. Their main tasks were to attack

ports and shipping, convoy attack and escort duties, the defense of naval bases and reconnaissance for the fleets. They were used in support of land operations during engagements in the coastal area and in support of amphibious operations.

Airborne operations were very limited in scope during the war, despite the fact that the SAF started taking interest in this during 1930. However, the airborne forces were an independent part of the Russian armies, being responsible directly to the Supreme Headquarters; their strength at the end of the war was about 21,000. Paratroops were used on a small scale in 1941 during defensive operations at Smolensk and in the Crimea, but these were a failure. In 1943 a large-scale operation was carried out on the Dnieper, but the airborne forces were not accurately dropped and were too lightly armed. The operation was a complete failure, and the forces were not used again until 1945 in Manchuria and Korea, where there was no opposition.

Tactics for airborne home forces were to assemble the aircraft about 100 miles behind the line and send on one aircraft to reconnoiter the landing grounds. Aircraft were then directed by radio and light signals and went forward in two groups, the first carrying the parachute men equipped with rifles and light machine guns, and the second group bringing the mortars and light guns in glider or transport aircraft. However, despite many years of pioneer work in the tactics and training of airborne forces, their operations were a sad disappointment, although they were used considerably for helping guerrilla warfare. But valuable experience has been gained and no doubt this arm could be expanded rapidly in time of necessity.

Factories and Research Establishments

The manufacture of aircraft is naturally one of the most refined and specialized types of industry, far more complicated

than the making of tractors or cars. Yet in this country we turned over almost the whole of the motor industry to the manufacture of aircraft and engines during the war. In Russia the great tractor factories formed the nucleus of the present vast aircraft industry.

By 1939 the aircraft industry was well established, although few modern types were in production. The German invasion of Poland caused a rapid expansion, just as the shock of Munich accelerated our own industry. Then came the German invasion. Some factories were overrun and most were threatened, so the decision was made to transfer the factories to the Urals and to Siberia. The decision was made early in the war, and while the factories were being moved, the fighting front had to manage, as best it could, with obsolete aircraft and the few remaining reserves.

However, a terrific drive must have been put behind the move, for at the beginning of 1942 the factories were going concerns and production was on the increase. During the following year the industry was built up at an ever-increasing rate, and by the beginning of 1943 the SAF was expanding rapidly while the German Air Force was dwindling.

This move of aircraft factories must be regarded as one of the greatest industrial achievements of the past fifty years. Not only were the factories moved bodily vast distances, but at the same time production was planned for new types, which, long before the end of the war, were pouring out like a river. Our own experience has taught us that it takes five years to get a new type of military airplane into production. The Russian engineers managed to do it in much less time, although handicapped by the move of the factories. By the end of 1944 all factories were producing the most modern types.

It is not easy to make any accurate estimate of the total productive capacity of the Soviet aircraft industry. D. F.

White, in his book "The Growth of the Red Army," estimated that aircraft production in 1936 was about 5,000 per year and that by 1939 it had risen to the figure of 20,000 per year. By the end of the war the SAF completely overwhelmed the *Luftwaffe* by weight of numbers and it would not be unreasonable to assess their front-line strength of operational types at about 20,000 aircraft, of which almost half would be fighters and the rest about equally divided between ground-attack aircraft and bombers. One can usually estimate that front line strength represents about a quarter of the total, which includes all immediate and stored reserves, training, civil and all other types of aircraft. Working on this rough-and-ready basis the total number of aircraft possessed by the Russians at the end of the war would come to about 80,000 or more.

Accepting these figures as an intelligent guess, and working from our own experience, one might estimate a fighter production capacity of over 2,000 per month and a bomber production of well over 500 per month. Trainers would probably absorb 1,000 per month. Aero-engine production, of course, must be in proportion.

These estimates may be only rather bad guesses but there can be no doubt that, at the end of the war, Russia had a vast production capacity which is probably retained, or even increased, today. Even more remarkable is the attention paid to research.

The Russians, by the end of the war, possessed at least ten Government research establishments, quite apart from numerous research laboratories attached to the great aircraft factories. There was the Central Aero-Hydro-Dynamic Institute and the Central Aircraft Engine Institute, the Soviet Union Aircraft Building Material Institute, and the Scientific Research Institute of the Army Air Force. Then there was a Scientific Research Institute for Aircraft Arming and a similar insti-

tute for aircraft materials. Even the civil air fleet had its own scientific research institute. The Soviets have also many experimental design bureaus, and research laboratories are attached to higher training establishments.

It seems obvious that the Russians realized, even before the war, that they were backward in the design of both aircraft and engines, and made a most determined effort to expand their research facilities. There can be little doubt that, by the end of the war, the Soviets possessed more state-controlled aeronautical research facilities than any country in the world. It is probable that these have been expanded since the end of the war—they certainly have been strengthened by the influx of German scientists and engineers.

Aircraft Engines and Armament

Superiority of equipment is a tremendous factor in any highly mechanized fighting service. In Russia production came first, and the Russian aircraft were generally inferior to those of the Germans. Yet towards the end of the war they had achieved complete air superiority over their enemies by weight of numbers.

The Russians got good results from their simple and crude equipment. Weight of numbers can tell, and it certainly did towards the end of the Russo-German war. The Soviets achieved this numerical superiority by a policy of concentrating their production on a few types of simple design.

Production and development passed through four stages. The first stage at the start of the war found the SAF equipped mainly with obsolete aircraft. During the second stage, designs were improved and orders were given for mass production. Meanwhile, the airmen at the front had to use their obsolete types, and the casualty rate was terrible. At this stage the Russians were fighting a losing battle. It was evident that the operational requirement staff did not lose their heads in this crisis,

but went quietly ahead and selected designs for their suitability for mass production, yet having reasonable performance.

The third stage was when standardization had been decided and production was underway. Now more attention could be paid to research work and to the development of new designs. Finally came the fourth stage, towards the end of the war, when the Russians knew that the Germans were defeated and so could really establish the development side of their industry.

Conclusions

There are four main conclusions to be drawn from a study of the SAF in war. The first is the very great importance the Russians attach to research and the great number of establishments they have set up for that purpose. Progress is likely to have had a steady acceleration since 1945, and has been strengthened by a powerful influx of German scientific brains. We may reasonably assume that the already powerful Russian research and development facilities have been expanded, and have, by now, done much work on jet engines, rocket motors, and guided missiles.

The second conclusion is that we must now look on the Russians as mechanized people with an ever-growing interest in things mechanical. Not until 1944 did they have time for research and new development, and their policy was devoted intentionally to quantity rather than quality. They have now had four years to make up leeway and we must not ignore the brilliance of their weapon designers.

The third conclusion is that great strides were made in SAF training during the war. Their basic material in the way of personnel is good, with a natural aptitude for mechanical training. Their bravery is fantastic. Finally, we must not forget that the Russian does really believe his propaganda. He is allowed to know nothing else.

Lastly, and perhaps most important, we must give careful consideration to the flexibility which the Russian Staff showed in the conduct of their operations. Although the SAF was virtually a huge Tactical Air Force, the leaders were always ready to learn from the enemy and to adapt their operations to the varying needs of war. While I think that their general

policy still holds fast to the tactical principle, they have the men and material available for the building of a great strategical force. We do know that the Russian aircraft factories are now producing in quantity the Soviet version of the American B-29 Superfortress, and this fact may well indicate a change of attitude towards strategical bombing.

Raids in World War II

Digested by the MILITARY REVIEW from an article by Major General R. E. Laycock in "The Journal of the Royal United Service Institution" (Great Britain) November 1947.

THE subject of this article is the raiding operations of the late war, and the lessons which we learned from them. By raids, I mean those connected with Combined Operations (either seaborne, airborne or overland). The raids to which I am going to refer might perhaps be defined as those in which the attack on the actual objective was invariably made by the soldier on his flat feet, although he might have been carried to and from the scene of operations, or at least part of the way there and back in ships, surface craft, submarines, aircraft or army vehicles. The great majority of our raids were seaborne, and the Royal Navy took us there and back with the associated air support provided by the RAF.

One aspect of the raid proper, as opposed to normal operations, is that it implies what one might call "smash and grab" tactics, as compared to sustained action, and although, especially towards the end of the war, raiding troops, having completed their original tasks, were given subsequent tasks inland, one normally expected that a raid would imply a withdrawal.

Specialized Units

As far as the actual soldiering side is concerned, raids were normally carried

out by troops specially trained and rehearsed in raiding operations, and the largest body of such troops was originally known as the Special Service Brigade and later as the Commando Group.

There were, however, also a vast number of other smaller bodies of specialized troops. There were the Special Boat Section, the Special Raiding Squadron, the Small Scale Raiding Force, the No. 30 Assault Unit, the Royal Marine Boom Patrol Detachment, the Mountain Warfare Commando, the Underwater Swimming Unit, and Combined Operations Pilotage Parties, not to mention larger formations, such as the Long-Range Desert Group, the Long-Range Penetration Groups, and the Special Air Service Regiments. This is by no means a comprehensive list.

I think the first lesson is that one must beware of the growth of "Private Armies." They spring up like weeds. Rival units are set up in different theaters, and even at home under different organizations and commands. Coordination is lacking, with a resultant waste in the design and production of equipment and, worst of all, manpower. I do not mean that specialists are not required in war. No modern army can function properly without them, but it is perhaps open to argument as to whether or not you want specialists for raiding. I personally think

you do, and I have never been one of those who subscribed to the theory that it was a waste of time to train Commandos because an infantry battalion could do the job just as well.

The answer to the question as to whether or not you require "specialist" troops for raiding is "Yes." But the lesson is: Don't raise too many; don't form odd units for odd jobs, because if they are worth their salt they ought to be quite capable of carrying out any particular type of raid. Furthermore, in order to economize in effort, manpower, and equipment, make one centralized headquarters, on the highest level, responsible for coordinating the organization, doctrine, training and technique, and the equipment of all raiding forces. If you agree with that, the obvious headquarters to take on that business, taking into consideration the essential inter-Service aspect of the raid, is Combined Operations Headquarters as at present organized.

You have your Commandos today in your peacetime set-up. They are found by the Royal Marines—a Corps whose tremendous traditions and history (including that of the late war) fits them most admirably to that task. If the Army could find a Commando unit or two to "gang up" with them, so much the better, because 100 per cent cooperation is essential. The firmer the links are forged in the future between them and the Army—and to a certain extent with the Royal Air Force—so much the better.

The various types of raids which were undertaken in the late war may be divided into four main categories: (1) Reconnaissance raids, (2) Raids in direct or indirect support of larger operations, including diversions and deceptions, by attacks on isolated targets or on the flanks or rear of the enemy, (3) Harassing raids, and (4) Sabotage raids.

Reconnaissance Raids

Take reconnaissance raids first: By

these I mean raids which were mounted with the object of implementing intelligence from normal sources, such as aerial photographic reconnaissance, by ascertaining the exact nature and location of enemy defenses, by the capture of prisoners to confirm or otherwise the enemy order of battle or by obtaining information about beach gradients, beach exits or the nature and depth of soil on enemy beaches.

Quite a good example of this type of raid can be found from those mounted to reconnoiter the obstacles on the French coast prior to D-day. When the Germans considered our invasion of France was a certainty, they started putting up various types of beach obstacles. This did not worry us unduly, because we had expected it, and had worked out a technique for dealing with it. But what did worry us was one morning when a pilot returned after flying very low over the beaches and when his films were developed they revealed mines made fast to the tops of the obstacles. We had to know what type of mines they were, so that we could deal with them. Small raids were therefore mounted to obtain the requisite information. Parties of perhaps one or two officers and ten to a dozen men were sailed from England in motor torpedo boats. About three miles off the enemy coast they transferred to 18 ft. powered boats known as dories, and in these they approached as near as they dared to the shore. They then transferred again into rubber dinghies in which they paddled to the beach and landed. German sentries were posted all along the coast. When, however, a suitable obstacle was found with a mine attached to the top, the No. 1 of the party got to work. He photographed it with a special infra-red camera capable of taking photographs in the dark. No. 2 of the party then tested to see whether the mine was magnetic. The next thing to do was to find out whether the mines were booby-trapped and would go off when tampered with later on

in the invasion. The experts who had been taken with the party and who knew a great deal about mines, came to the conclusion that they were definitely only ordinary teller mines. It was only then necessary to send over parties from time to time to confirm that no new types of mines were being used.

Planning and Rehearsals

To undertake a raid with any hope of success involves the most intricate detailed planning and rehearsal. Every single man taking part must know exactly what he is going to find when he gets to his objective, and if everything goes right he knows where he is to within a few yards, and he can find his way about in the dark.

But here we come to our second lesson: I would call it the necessity for, but also the dangers of, intricate planning and rehearsals. I think the necessity is obvious. The more thorough the planning and rehearsals, the more likely is the raid to succeed. But there are also dangers, and they are two-fold.

If you ever get involved in planning raids (even large scale raids) don't forget that the luxury of planning to intricate details is by no means always possible in war, and don't later (just because you have been used to it) let it prejudice that essential quality of every good soldier of being able to meet adversity. Flexibility of mind and action must be the watchword.

Supporting Raids

I think a good example of improvisation and initiative was provided by the action of a Detachment of No. 3 Commando, on the Dieppe raid. This also serves as an example of a raid which is mounted in support of a larger operation, either indirectly, at some distance from the main objective, and possibly well before it is time, for deception purposes, or directly in support in the form of diversions or attacks on iso-

lated targets with which the main body does not wish to become involved.

In the case of the Dieppe Operation, it was the last of these roles in which the Commandos were employed. The Canadian Division attacked in the area of Dieppe itself, but there were two coast defense batteries on the flanks, one to the northeast and the other to the southwest, and it was essential that they should be silenced, since they might otherwise have played havoc with our shipping off the main beaches. No. 3 Commando was allotted the northeast battery at Berneval.

Almost from the start everything went wrong with No. 3 Commando. The first thing that happened was that by ill-luck the landing craft flotilla ran foul of a heavily escorted German convoy which happened to be sailing south that night. The escorts shot up our landing craft and the flotilla got hopelessly adrift in the dark. Some landing craft were sunk, others were disabled, and there were many casualties among the soldiers, some of whom were swimming about helplessly in the dark. Five of the R boats beached about two miles from the correct beach and never re-embarked, nor did they get anywhere near the objective.

One landing craft, however, beached nearly in the right place, and it contained a strange party, including the Second-in-Command and some of the Headquarters staff. The whole detachment totalled three officers and seventeen other ranks. They had one Garand rifle, nine service rifles, one Bren gun and six Tommy guns among them. Two of the men were runners, two were signalmen with no one to signal to, and four were spare men from a mortar detachment. But, this is the point: Those three officers and seventeen men managed to do the job. Their task was to stop the coastal defense guns firing at our shipping, and none ever fired anywhere near our ships

until the main operation was over and our ships were at extreme range or out of range.

A party of three officers and seventeen other ranks isn't very large for an attack on a battery manned by 200 men, but they managed to scale the cliff and to get well inland in the rear of the battery without being seen. Then, by dashing about and shouting bogus orders, and showing themselves in different places, they succeeded in completely shaking the confidence of the battery commander, who obviously thought he was being attacked by at least a Commando 350 strong. He lost his head sufficiently to traverse his guns round and shoot at the soldiers on the shore instead of at the ships at sea.

Only one of our party was killed, and he was blown up on a mine on the way back to the cliff at the bottom of which the remainder successfully re-embarked. This they did when the main operation was over, and they had done the job which 350 men had set out to do.

Initiative and Improvisation

And so we learn lesson No. 3—the paramount importance of initiative and the ability to improvise when the plan breaks down.

For raiding purposes try and perfect a technique which will enable you to use ground which looks impassable. Good beaches are nearly always mined, bad beaches never; practice rocky landing technique. Good landing grounds are defended by *flak*, bad ones are not, and I am sure that there is great scope for the parachutist who can learn to drop on broken ground or in wooded country.

Harassing Raids

Now let us pass on to the third type of raid—the harassing raid. This type of raid is mounted with the object of playing on the enemy's nerves. It is carried out by small parties—generally one officer and

five other ranks—and it nearly always paid a dividend out of all proportion to the effort put into it. It makes the enemy apprehensive of his lines of communication, with the result that the enemy starts employing hundreds of men for static and security guards in back areas, who would otherwise be sent to reinforce the fighting troops.

Perhaps one of the most interesting aspects of those five or six men raids was the ingenuity displayed by the detachments in getting to their objectives through the inner enemy defenses. Their pet trick with road blocks was to hide their jeeps near the road in the dusk and wait for an enemy convoy to come along. When it arrived they fell in astern of it and motored serenely through.

On one memorable occasion, when a party found an alert Italian sentry on a road block just outside Benghazi—then some 300 miles behind the lines—one of the officers, who was a brilliant linguist, marched up to the man and, speaking in Italian with a German accent, said he was a German Staff Officer dressed up to test security schemes. He had the whole guard paraded, gave them a long lecture on security, while the remainder of his detachment marched through the road block in a formed body.

An extended theater of operation gives tremendous scope to small units composed of men who love adventure, and who can keep their wits about them in a tight spot.

The Sabotage Raid

That brings me to the last type of raid—the sabotage raid.

These raids were mounted with the object of striking at the enemy's industrial war effort, and aimed at the destruction of vital plants or machinery which did not present a very satisfactory target for our bombers.

The famous raid at St. Nazaire was quite a good example when, as you will

remember, the lock gates of one of the only docks which could take the battleship *Tirpitz*, was destroyed. It is true that a very large proportion of those who took part in the operation became casualties, but the price was small for the results achieved.

Another very successful raid of this type, though on a much smaller scale, was that carried out at Glomfjord, in Norway. Here two officers and eight other ranks of No. 2 Commando landed from a Free French submarine. The objective was a factory connected with the production of aluminium, which was vital to the *Luftwaffe*. The submarine surfaced on a dark night about half a mile off shore, and the men succeeded in paddling ashore in rubber dinghies, unseen. A three-days march brought them to the vicinity of the factory, where they lay up for two more days learning the lay of the land and watching the conduct of the guards. On the sixth night they attacked. They had two objectives. One was to place charges on the armatures of the three generators in the power house which fed the factory,

and the other was to blow the great pipes which supplied the water power from the mountain. The first effort in the power house was not wholly successful, because only two of the three charges were blown successfully. The party, having succeeded in withdrawing from the power house with only one killed, climbed the mountain at the back of the factory and placed their charges on the penstocks. The result was terrific. When the charges were blown the resultant rush of water and rock down the mountainside almost completely flattened the power house and rendered the factory useless.

I have touched on a few lessons, but there are, of course, many more, such as: The value of training in darkness, etc.; the effect on morale on inevitable cancellation and trying to keep men in top shape for long periods; the value of industrial training for saboteurs; the development of infra-red equipment; the technique of picking men off the ground (the opposite of parachuting) as a means of evacuating saboteurs; and many others besides.

Development of a Doctrine of War

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel José Ruiz Fornells, Staff, in "Ejército" (Spain) April 1948.

Future Warfare

PROPHETS are found in all walks of life, including the military profession. These prophets show up especially after the end of a conflict, basing their prophecies on spectacular incidents of the recent war, and usually giving out statements which have little basis in fact. For example, in 1918 it was prophesied that future wars would be short, and that a decisive element would be chemical warfare. Future wars have been discussed in the same way during the past few months.

No doubt the establishment of a war

doctrine requires forethought as to the trends that future wars may take. But this forethought should be founded on more solid ground than that of willful thinking and fantasy.

All military action is based on past events, accomplished in the present, and extended into the future. Because of this, any theories on war would be worthless if we limit ourselves to studying past events without giving thought to the lessons learned from them, and how they might affect the future.

It has been stated that a future war be-

gins where the last war ended. This, of course, is far from true, because everything in war is subject to evolution.

It cannot be said, therefore, that each war begins where the preceding one left off. Between each war innumerable changes take place in all aspects of life. This does not mean that past experiences should be ignored, because they can afford valuable points for comparison with peacetime. Last, but not least, past experiences, plus present events, are the only things upon which we can base our judgment of the future.

For present knowledge and consideration, we have current peacetime military maneuvers and foreign wars. In the first instance, we find that maneuvers permit us only to experiment with matériel, and even these results are doubtful, since they lack a sense of reality.

Everything learned from the present should stimulate the imagination. By this is meant that present events should be pictured in our minds so that we can re-live the events, the better to realize their effect on the future. Imagination cannot substitute for experience or knowledge, but they all should be complementary in attempting to fathom the future.

Three Factors

The first thing to be learned is that three factors should be considered together: That warfare depends upon the times, that armed conflicts are the result of politics, and that the manner in which wars develop reflects the civil life of a people. Then we learn that tactics, that is the arms to be employed by the troops in combat, depend upon the technique to be used, and that the strategy varies in relation to the tactics employed but fundamentally remains the same. Lastly, there is the belief that the moral factor is always decisive.

The answer to the question of the nature of future wars should then be sought with these three points in mind.

There are those who believe that future wars will be characterized by advanced machines and super-motorization; by the complete victory of industrial machines over man. Others are doubtlessly highly impressed by the excellent results obtained in what might be called "micro-war"—by small groups of assault troops especially trained for individual combat and for assault and destruction of important positions; by commandos; by the action of guerrillas and saboteurs; by suicide planes; by "human torpedoes," etc. They imagine the next war as an immense and unique battle campaign, in which there are no frontiers, no battle fronts, no distinction between combat zones and zones of the interior; nothing except a vast conflict among all classes, anarchy, fighting everywhere, and with all means available.

Other new factors causing speculation are rocket bombs, jet motors, high speeds, the extended radius of action of aviation, perfection of radar and remote control. Atomic energy is viewed by some as a formidable means of attack capable in itself of deciding victory. Others, on the contrary, believe the atomic bomb to be a means by which to build a formidable and impenetrable defense barrier which no man or machine could penetrate. These factors lead one to believe in a complete revolution in warfare, perhaps even more revolutionary than the discovery of gunpowder.

It cannot be denied that we are facing a crisis in all things involving past warfare and that it is difficult to predict what will develop in the future. The many questions that may arise are difficult to answer.

If the explosive of the future is to be the atomic bomb, capable of producing great destruction, the large bomber planes will be useless and will be replaced by small, high flying, speedy planes. It is no longer difficult to believe in the possibility of constructing artillery am-

munition and rocket projectiles with atomic energy. Warships will be able to carry, in an extremely limited space, a far more destructive power than heretofore provided by their guns, thereby extending their radius of action and increasing their speed. Jet motors and atomic power will revolutionize speed.

Since we are in the midst of the experimental stage, it is impossible to make a categorical statement in this respect. But it is interesting to note that this revolution in the methods of warfare will not have any influence except upon the forms of warfare. The methods will vary and the forms will be modified, but principles have not been established for determined methods, although they regulate warfare in a general manner insofar as they are alterable.

For example, the discovery of gunpowder did not change the established principles of ancient wars which were later so successfully applied by Napoleon.

Technology

In the past when vital issues were at stake, all available forces were deployed, but all the forces and all the methods could not be adapted to the struggle. At present, however, the great progress made in technological matters has greatly increased the areas in which the effects of war are felt. The indirect participation of politicians in war has made war, as a violent continuation of politics, a point of interest to each and every member of a nation.

If we accept these points as true, it means that wars will be of long duration. It is true that each side will try to shorten a war, and in order to obtain this objective will employ the most radical and effective means possible. But the employing of extreme means by one side will bring retaliation from the other, resulting in increased bloodshed. The idea that the perfection of armaments is an indication of a short war is therefore

groundless, since each new weapon is soon countered with an antidote. Only the possession of an unusually effective weapon of a technical or chemical nature, against which an opponent is unable to make a countermove, can bring prospects for a quick finish to a war. This is the present situation as regards the atomic bomb. On the other hand, how long will the secret of the atomic bomb belong exclusively to one nation or a group of nations? Can its effects actually be so decisive? The experiment on Japan, a country of limited and densely populated territory, already morally and materially defeated, cannot serve as a point of comparison. Would the atomic bomb have produced such effective and decisive results in another place or at another time? If, on the other hand, we take into consideration the international interdependence of science, will a balance be established in the employment of technical means?

There is no doubt that modern technical development of weapons has not as yet reached the fullest extent of its possibilities. World War II taught us that nothing is impossible, and because of this we shall not scorn the idea that in the future men will fight with arms and means which are today beyond our powers of imagination. But because warfare cannot deal with anything beyond the arms which are in use today, it is obviously necessary to maintain elasticity in order to conform rapidly to the new methods of future warfare.

Coalition Wars

Future wars will be in coalition, although instances of one country against another shall not be completely eliminated. But such cases of localized struggles will take place when the objective is of interest only to the two belligerent countries, or when the objective is of secondary importance to world politics in general; or when the theater of war is far enough removed from world routes and

world politics. The great wars which will threaten the existence, or decide the destinies, of nations will be wars of coalition.

The present importance of economic factors supports this belief, because it is well known that no state exists which is completely self-sufficient economically or militarily. Another point that supports the belief that future wars will be coalitions is the ever-increasing importance of the air force, whose increasing possibilities and wide radius of action has increased the possibilities for extending offensive action and providing mutual aid between nations, even though they may be widely separated from one another. This has greatly increased the possibilities of forming alliances. Countries which previously had only one front on which to concentrate, now find that it is probable that they will have several fronts to defend. Frontiers will not necessarily be the areas of battle, as the fighting may take place in remote regions where previously conflict has hardly been considered possible.

Economic Factors

In future wars, economic pressure will most likely be brought to bear from the start. There will be no waiting for some military stroke to decide military action. It must always be borne in mind that an economic blockade is impossible unless complete control of the seas is achieved. Effective air action against sources of supply can be realized only after enemy air forces and antiaircraft defenses have been completely destroyed or neutralized. As long as military defenses exist, it will be necessary to fight a decisive battle. The fact remains that after two great wars, the participants have not only remained armed but are at present expanding their forces. As long as economic resources worth defending exist, military defense will exist. As long as these means of defense exist, those properties and

assets can be considered defended; and as long as this defense is able to act, armed strength will be employed for the annihilation of adversaries. As long as the struggle for annihilation continues, military strength will be of first-rate importance to the life of nations.

The tremendous development of air forces has made many nations ask whether or not ground forces will be necessary in the future. This was first asked by Douhet and his many followers. Douhet advised the fullest possible development of the air force, and the maintenance and perfection of the ground and sea forces only as a pillar upon which the expanding air forces could rest.

Air vs. Ground

Undoubtedly the air forces have earned the right to be considered equal to the other forces, but it is also doubtful that complete and permanent control by air can be obtained unless they have annihilated the enemy's air force, its bases of operations, its aircraft production plants, and destroyed its sources of supply. This cannot be done without sea and ground forces. It should also be borne in mind that, in spite of their progress and independence as a corp, and their increased flying safety, air forces depend upon ground bases, and their action is limited by weather conditions. It must also be borne in mind that the use of bombers in the future will be reduced because of rocket bombs, radar, and long-range antiaircraft guns, which are formidable weapons in the hands of defense.

It cannot be denied that the air force has changed the aspect of war as no other weapon has done to date. But there is only one answer to the problem of war in the air versus war on the ground. That answer is: War in the air, on ground, and on the sea. This does not take into consideration the fact that air power has not yet reached the limit of its progress. The possibilities of jet propulsion and the

discovery of radio activity lead some to think that antiaircraft defenses will be revolutionized, thereby neutralizing, if not nullifying, the effectiveness of air attacks. The unity of the armed forces—land, sea, and air—is today a fundamental law for war, which nothing up to the present justifies changing in the future. It is as fundamental as the unity of the other great means of war: Military, spiritual, and economic. All serve the purpose of ending the war; weakening enemy resistance; annihilating combat forces; and destroying, neutralizing or eliminating sources of energy. All means should be employed to achieve these ends, but the ultimate end will remain the same—victory.

Large vs. Small Armies

A few years after World War I, military circles began debating a new and important question which pertained principally to organization, but which in effect concerned strategy and tactics. The problem was whether armies should be large or small.

It may be irrelevant to bring up this matter after World War II and at a time when the great powers are reinforcing and expanding their forces. But in the arguments brought forth in discussing this question there are points of great interest.

The group in favor of small armies, as advocated by Douhet, believes in assigning defense to the ground forces exclusively, since large forces are considered unnecessary. But Douhet formed his theory with Italy in mind. Italy has a mountainous terrain, and its flanks are surrounded by water, making operations difficult; her land frontiers can be covered and effectively defended by a small force. But

in this event she would be resigning herself from all attempts at offensive warfare, which is the most effective way of reaching a decisive victory. This theory could not be applied to large nations with vast frontiers.

Another group advocates that armies be completely motorized or mechanized, since the resulting mobility, power and defensive potential represents a notable saving in manpower. It is also maintained that since mechanized armies would have greater and faster penetrating powers, a quicker victory could be had. The greater capabilities for threatening and destroying enemy communication lines would make the enemy collapse sooner, thereby eliminating lengthy and costly battles.

Tanks and mechanized units play an important part in making maneuver quicker and easier, but their action cannot be decisive unless the enemy completely lacks morale or has inadequate defenses. It is not sufficient merely to reach an objective. An objective must be securely held and the enemy prevented from holding it or making use of it in any way. Besides, tank and mechanized forces depend upon their supporting services—communication lines, gasoline and oil supplies, repair shops, etc. Their action is brief and not continuous; they are not adapted to all types of terrain; and last, but not least, it should be remembered that antitank defense methods have developed hand in hand with the offensive.

It has been assumed in this discussion that both sides possess small armies. If large armies were involved, all these arguments would not stand. There is no evidence today to indicate that small armies will prevail, and it is probable that nations will continue to maintain large armies for defense.

Japan's Hybrid Carriers

Digested by the MILITARY REVIEW from an article by Paul W. Martin in "The Navy" (Great Britain) September 1948.

NONE of the world's navies showed more interest in the development of a naval air force than did the Japanese. From their first crude experiments with naval aircraft until the destruction of their fleet, they were among the pioneers in this field.

They constructed one of the first "built-for-the-purpose" aircraft carriers, the durable *Hosho*. They were among the first to employ the fast carrier task force. They early realized the possibilities inherent in the cooperation of land based aircraft with naval forces. But they were also responsible for turning out some of the most remarkable vessels in the long history of naval construction.

During the early 1930s, there was much discussion of the inter-relation between aircraft and warships. The airplane had achieved stature as a military weapon during World War I, and soon established itself as an important factor in naval warfare.

It was a new weapon, however, and the question of how it could best be employed was much debated. Informed opinion could generally be divided into two groups: Those who considered the airplane simply as another type of naval gun that could fire its projectile over much longer ranges, but with less accuracy than the standard naval rifle, and those who foresaw that it could be a new primary naval arm, necessitating its own methods of tactical and strategic employment. The Japanese leaned towards the latter theory. But they were unsure, so they worked along both lines. And it was the first opinion that supplied the theoretical basis for the unusual ships.

When a new weapon is in the process of replacing or supplanting an older one, there is often a tendency to combine the

two. So it was with the cruiser and the airplane. For centuries the cruiser-type vessel, and its direct ancestor, the frigate, had been employed on scouting and patrol duties. Now the airplane, with its great range and enormous field of vision, was usurping the cruiser's place.

In the US Navy Pacific War Games, the old *Lexington* and *Saratoga* were demonstrating how effective aircraft carrying vessels could be. Soon, in England, America and a number of other countries, the idea of a "flight-deck cruiser" was put forth, almost simultaneously.

The general design was of a cruiser-sized vessel which retained part of a cruiser's armament, had a flight deck from which to operate approximately twenty aircraft, and which was supposed to fulfill all the duties of the then new heavy cruiser and the virtually untried aircraft carrier. This was "the airplane-just-another-gun" theory in its simplest concrete form.

The idea was considered in one guise or another for ten years or so, but finally naval authorities concluded that the type would result in a ship which would be ineffective as cruiser or carrier, and it lost favor.

Except in Japan! For the Japanese had been most interested in this idea and, when they devised a method to retain the aircraft facilities without subordinating gun-power, they began work. What inspired them as much as anything else was the strange Japanese affinity for the seaplane. Every other navy had relegated the seaplane to reconnaissance and long-range bombing work, as the features peculiar to this type lessened its military effectiveness considerably. But the Imperial Japanese Naval Air Service employed seaplanes for every type of mission and it

was in these seaplanes that it thought it had found an answer to the cruiser-carrier problem. It reasoned that a cruiser could operate eight of these seaplanes, and if its aircraft accommodations were well thought out, it could operate them with an efficiency comparable to a vessel with a flight deck.

These beliefs were further strengthened by the considerable success the Japanese had with their early seaplane carriers. Except for a decrepit Italian vessel and an ill-designed French unit, this type was an exclusively Japanese product.

for handling and servicing the ship's aircraft. The "*Miduhos*" carried about fifteen small seaplanes as their normal complement, and were fast enough to serve with combat task groups.

Even while the new seaplane carriers were being built, the Japanese started work on their first true hybrid carriers, though in this case hybrid seaplane carrier would be the more accurate term. These were the heavy cruisers *Tone* and *Chikuma*.

Authorized in the estimates for 1933, they were in many respects similar to



The *Ise* was one of the two old battleships which the Japanese remodeled to provide a hangar and a 180-foot flight deck.

Their first two units, converted oilers, had worked out well, and the Japanese subsequently laid down four big "built-for-the-purpose" seaplane carriers, the *Miduhos*, *Chitose*, *Chiyo*, and *Nisshin*. Extremely large, they were among the strangest-looking warships ever built. Their flush deck stretched from aft the bridge to the stern, unbroken, except by four catapults, two on each side, and a pair of enormous gantry cranes, set diagonally to the center line of the ship. A crane was mounted on the stern for retrieving the planes, and a track ran down the middle of the deck

their immediate predecessors the 12,000-ton "*Mogami*" class. They retained the *Mogami* pronounced sheer and trunked funnel, the pylon masts and massive bridge, the extremely heavy torpedo armament and antiaircraft guns grouped amidships. They had the triple hulls and heavy protection that had become part of Japanese heavy cruiser design practice.

But in one most important feature the "*Tones*" varied. Instead of the 3-A-2 (the official US Navy designation of turret arrangement—three turrets—superstructure—two turrets) main battery dispo-

sition that was standard on modern Japanese heavy cruiser construction, the *Tone* had one turret entirely eliminated, and the remaining eight 8-in. guns grouped forward in four twin gun-houses.

This meant a considerable weight-saving in reduction of armored area. But gun arrangements similar to this had been previously tried by Britain and France, with the result that weight saved had been considerably over-balanced by a loss in tactical efficiency.

The Japanese were not out to cut tonnage, however. They had something entirely different in mind. For built in aft on these cruisers were some of the best aircraft handling facilities ever put on a primarily gunnery ship. A seaplane ramp led up from the stern to a series of intersecting tracks to facilitate the handling and servicing of the aircraft. Flanking these tracks were two catapults. At the stern a crane was fitted to pick the planes up from the water; there was another at the head of the ramp to handle them in the service area and on the catapults. The two cruisers could carry eight aircraft apiece, but the normal complement was four, two of the type 95 reconnaissance seaplanes and two type 00 ("Zero") float-equipped fighters.

Following the "*Tone*" class the next in the line of hybrid carriers was the 6,000-ton cruiser *Oyodo*. Commissioned in February 1943, she was one of the four war-built Japanese 5.5-in. gunned light cruisers which were little more than oversized destroyers. She differed from her three near-sisters and the earlier *Noshiro*, however, in that she carried a large rotating catapult. *Oyodo* had a prominent hangar aft of her squat funnel, and a crane fitted for the handling of the two small seaplanes which she carried.

It was not until 1944 that the Japanese came up with the most exceptional ships of them all. These were not cruiser-seaplane carrier combinations, they were true hybrid aircraft carriers.

The Japanese had taken two old battleships, the *Ise* and *Hyuga*, removed the two after turrets of their 2-A-2-2 main battery, and replaced them with a hangar and a 180-ft. flight deck. A T-shaped elevator was installed for handling planes, of which about twenty were carried.

With the absence of official data, personal information indicates that the aircraft were launched by means of fixed catapults on either side of the abbreviated flight deck, but how the Japanese landed them on is another question. Their carrier arresting gear was comparatively poor, and it would take an expert Landing Signal Officer to wave off an incoming plane in time to clear the lofty superstructure of the exbattleships. But apparently the Japanese somehow managed to skid their planes on to the diminutive flight deck. Needless to say, the number of accidents suffered by the *Ise* and *Hyuga* in operating their attenuated air groups must have been enormous.

The *Tone* and *Chikuma* were unquestionably the most successful of the hybrid carriers. They participated in most of the major Pacific actions, and their seaplane complement did excellent reconnaissance work on a number of occasions. Both were included in the Pearl Harbor attack force, serving as screen support with the Japanese Battleship Division 3, and their aircraft flew observation and patrol missions over the target area before and during the attack.

Following the Pearl Harbor strike, the two cruisers were detached from the main task force to support the invasion of Wake Island. Here they employed their planes for gunfire spotting. Next they were reassigned back to the Carrier Striking Force as gunnery support for the Japanese aircraft carriers in their sweep through the southwestern Pacific and the Indian Ocean.

The two cruisers then returned to Japan for a short refit, upon the completion of which they were ordered to the Striking

Force for the forthcoming attack on Midway. Again their seaplanes did good service. The *Tone* and *Chikuma* aircraft made at least five separate contacts with the US carriers, reporting their position to the Japanese striking forces.

Here, for the first time, the two heavies were under attack, more than thirty bombs being aimed at the *Tone* herself, but both ships were virtually undamaged, and returned to Japan after their task force had

cruisers were pulled back into the central Pacific, where they were not in action again until the battle of the Philippine Sea in June 1944. Again their search planes made contact with the American carrier forces, and once more the cruisers were undamaged as they watched their carriers receive the force of the American attack.

The two hybrid heavy cruisers saw their last action at the battle of Leyte Gulf.



The Japanese battleship *Ise* rests on the bottom of Kure harbor after an encounter with the US Third Fleet in July 1945.—US Navy photo.

been smashed by American carrier air groups.

After Midway, the two cruisers were sent down to the Solomons area. Both flew search missions at the battles of the Eastern Solomons and Santa Cruz, but in the latter action a flight of dive-bombers from the USS *Hornet* caught the *Chikuma* isolated from the main Japanese force, and damaged her heavily.

By now the Japanese naval situation was rapidly deteriorating, and the two

Assigned to the main Japanese force which was intended to break through into Leyte Gulf by way of San Bernardino Strait, they were heavily attacked by US carrier aircraft the *Chikuma* sunk and the *Tone* sent limping homeward—to defeat.

The other hybrid carriers did not achieve nearly as much success. The four seaplane carriers were all heavily damaged at various actions and eventually sunk, two by submarines, two at Leyte Gulf following their conversion into regular light

fleet carriers. The *Oyodo* never saw action at all. The *Ise* and *Hyuga* made their ignominious first appearance as battleship-carriers as part of the northern "bait" force used to draw away the American Third Fleet carriers at Leyte Gulf. Then, after a period of convoy work, they ran aviation gas through the US blockade to Japan in early 1945, where they remained anchored until sunk by American carrier aircraft at their moorings.

This, then, is the story of the hybrid carriers. Taken as individual tactical units they were excellent ships. The *Tone* and *Chikuma* would have been unsurpassed as surface raiders, the *Oyodo* might have made a fine flotilla flagship, even the *Ise* and *Hyuga* would have served well with detached forces on raiding or convoy missions.

But there was no strategic justification for their existence. They were built or converted under the incorrect premise that aircraft and guns were interchangeable military weapons, that a sacrifice in one would be a gain in the other.

What makes their construction even more remarkable is the fact that the Japanese apparently understood the changes in naval warfare necessitated by the use of aircraft. They employed the hard-hitting fast carrier task force as early as Britain or America. They knew perfectly well that the surface gunnery ship was

gradually being assigned to a new role as a support vessel for aircraft carriers. They realized that the aircraft carrier had become an entirely specialized type of vessel, and that the old concept of carriers as glorified heavy cruisers had to be replaced by one in which they were true capital ships.

They knew all this, yet they built these hybrid carriers, ships that would have been tremendously effective when aircraft were still an auxiliary naval weapon, but whose planes were now all but useless in an ocean dominated by great regular carriers, one of which could launch more planes than all the hybrids combined.

In the new-style warfare, the *Tone*'s expanse of fantail should not have held a crane but a nest of light A/A guns. The *Oyodo* should have been an antiaircraft cruiser instead of a scouting unit, similar to the comparably sized British *Scylla* and the American "Oakland" class. The *Ise* and *Hyuga* would have been more valuable as ordinary battleships. The seaplane carriers should have been converted (and two of them were) into infinitely more effective light fleet carriers. But the Japanese failed to realize just how much the character of naval warfare had been altered, and from this failure stemmed some of the most remarkable naval vessels that ever steamed in the staggered gray lines of a battle formation.

Hitler's Conferences—1944

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DURING 1944, the German naval conferences became less frequent. The navy had lost the greater part of its attack forces, and in order to prevent new allied landing it would require ships which were far from completion. It was awaiting the delivery of new submarines, to be used for resuming the offensive with new tactics.

Therefore, the Navy passed out of the limelight for the time being. The dynamic personality of Doenitz constituted, however, firm support for Hitler. He therefore called in Doenitz once a month, not particularly to discuss naval matters but to have him present at the most important conferences.

Doenitz was called to Hitler's headquarters on 18 and 19 January. It was his first meeting with Hitler since the loss of the *Scharnhorst*. On other occasions, this event would have provoked violent diatribe. Hitler contented himself with a brief description of the operations of 26 December, but could not restrain himself from accusing the commander of the force of having ceased battle against the Allied cruisers too soon. It was proof that, in spite of his orders, the commanders were always too concerned about the security of their ships, and he recalled with some bitterness the affair of the *Graf Spee*.

Doenitz explained that without radar combat vessels found themselves reduced to a state of semi-impotence and that, in any case, they would be incapable of preventing a landing. He insisted that it would be better to keep them in the north where they would remain as a threat to the Russian convoys. He also proposed sending to Trondheim the last of his heavy cruisers that was still in commission—the *Prinz Eugen*. Hitler acquiesced without comment.

The arrival of Minister Speer started a general discussion relative to the matter of radar and high frequency detecting apparatus. The creation of a central service for electronic research was decided on and its direction given to Dr. Lueschen. Doenitz afterward explained his program for the construction of pocket submarines and small torpedo-carrying launches, then announced the placing in service of the new cement beach-defense mines at the rate of 1,200 per month.

Hitler insisted that precedence be given to the defense of the Holland-Skagerrak zone, which was particularly vulnerable. To the question as to what extent naval forces would participate in the land defense, Doenitz replied that he was opposed to any shifting of his units which, for the greater part, were composed of men who were undergoing training. The cruisers, whose staffs were made up al-

most exclusively of officers destined for submarine service, ought not, he insisted, be interfered with except in a case of absolute urgency. He got Hitler to admit the correctness of his views. The latter then questioned Doenitz with respect to the performances of the new electric submarine whose low surface speed (fifteen knots) surprised him. It was explained that the lines of the hull were designed from the point of view of maximum efficiency when completely submerged and were, therefore, poor for surface navigation. But this explanation did not satisfy Hitler and he insisted on additional tests being carried out.

During the course of a general discussion on the various theaters of operations, different generals asked for the aid of naval units. Doenitz firmly maintained his decision to oppose all movements on the part of his units, which were not to participate in ground action except in the location where they were stationed.

Anzio

Four days after these conferences, the Allies landed at Anzio and Nettuno (22 January). Hitler considered this landing operation as a general rehearsal for the great invasion and attached the greatest importance to the lessons which the different arms could draw from it. Doenitz had prepared a memorandum for the Navy fixing the principal missions incumbent on it, which could be summarized as follows:

- a. The attack of landing craft by means of submarines, patrol boats and coast artillery.
- b. The attack of the invasion zone by means of pocket submarines and small combat units.
- c. The employment of concrete mines detonated at a distance.
- d. Vigorous diversion by means of an intensive submarine campaign in the Atlantic.

The feeble forces in the Mediterranean

made it almost impossible for the first three of these lines of action to be carried out, hence principal effort was directed along the lines of the fourth. A violent submarine campaign was begun during February and its results were the object of protracted comment during a conference which took place on the 26th of that month. The cooperation of the *Luftwaffe* had permitted spotting a convoy on its departure from port and maintenance of contact for a period of several days, but scarcity of planes did not permit maintaining surveillance up to the day preceding the attack. The submarine formation had not been able to move far enough to the south to make a massed attack at dawn. Only a fraction of the formation succeeded in attacking after nightfall. The strong protection afforded by the escorting carriers had prevented the continuation of the attack, once daylight arrived.

These facts indicated the enormous superiority that submarines of the XXI type would have had in an engagement of this kind, and confirmed in every respect the new tactics of submerged pursuit.

Doenitz' views were warmly approved of by Hitler, who promised to prevent any new delay from interfering with placing the type XXI and XXIII submarines in service. The type XXI submarine, which was remarkable from the point of view of its performances while submerged (nineteen knots while submerged to a depth of 300 meters), was made up of eight prefabricated sections, a profiled vessel without deck or appendage of any sort, and with recessed lookout and AA guns. It was able to submerge in less than thirty seconds and navigate with the aid of its *Schnorkel*. It was later surpassed by the type XXVI which was provided with a Walter turbine operating by the decomposition of nitrogen-peroxide (Ingoline). Hitler questioned Doenitz relative to the possibility of creating submarine bases in the Aegean Sea. He feared Allied action

against the Peloponnesus and wished to make use of Moudros, Lemnos, or Salonika. Doenitz outlined the vulnerability of these bases and the additional load that would result from the task of fitting them out. At the conclusion of the conference, Hitler announced his decision to group together, under Himmler's orders, all the counter-espionage services of the three arms.

New Weapons

During March, a short interview gave Doenitz the opportunity to report concerning test with various new weapons, one-man torpedoes, particularly. It was decided to employ the *Mohr* at Nettuno. The *Mohr* was composed of two torpedoes coupled together, one containing the pilot, the other, which could be released, containing the explosive.

The April conference had to do with the *Tirpitz* and the Norway convoys. The last German line vessel had just been seriously damaged again by bombs. Doenitz insisted that it be repaired in order to continue the threat against the Russian convoys, but he insisted that the work be performed where the ship was located since the return of the boat to Germany might bring about another outbreak of air attacks.

Since the disablement of the *Tirpitz*, submarine activity against the Murmansk convoys had increased. But the Allies were now employing escort carriers, which made the task of the submarines increasingly difficult. Doenitz demanded that the *Luftwaffe* take over the task of attacking these convoys.

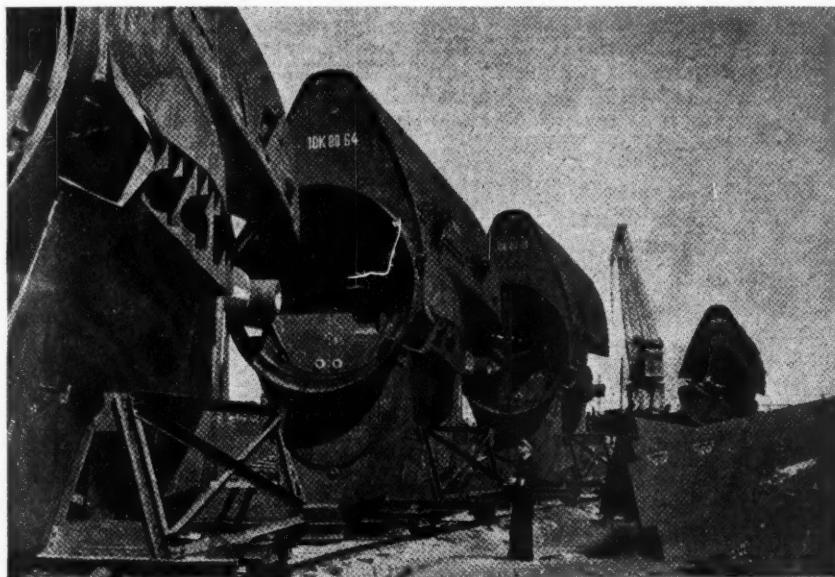
Goering was opposed to any such action, protesting the heavy load that would thus be imposed on the *Luftwaffe*. But Hitler supported Doenitz' views and gave Goering orders to organize an air attack on the next convoy. Goering asked that the Navy at least prepare the landing fields and organize the raids in order that his squadrons might not be immobilized for more than a day or two. Doenitz then

called attention to the fact that the spotting of the convoys and selection of the most favorable moment for the attack required the continuous presence of all the attack units over a period of four or five days, and an agreement was finally reached on this basis.

The conference ended with a dissertation by the Grand Admiral on submarine warfare which, in spite of very heavy losses, still presented a serious threat to

points for the prefabricated elements), had just undergone very heavy air attacks. AA protection was weak. Two years would be required for completion of the concrete shelter projects; immediate measures had to be taken: Smoke screens, AA artillery and fighter aviation.

Goering, as usual, opposed Doenitz' suggestions, declaring that none of these measures would guarantee protection of the shipyards, and Hitler had to intervene in



Section of the submarine type XXI ready for final assembly.

the Allied convoys and held a large force of naval units in the Atlantic. He again expressed his complaints relative to the delays occasioned in the construction of types XXI and XXIII as a result of the priorities accorded the *Luftwaffe*.

This same matter was to be considered again on 17 May. The Hamburg and Danzig shipyards (sole final assembling

support of the requests of the Grand Admiral. He called in Minister Speer to urge more speed in the protective projects. Doenitz, after this, gave an account of the last attack on a Murmansk convoy. The submarines of the first patrol line had succeeded in getting at the convoy and had sunk several freighters and destroyers. But during the following days, the convoy

moved southward and its air protection became too powerful making it impossible to carry out further attacks. As for the *Luftwaffe*, it did not possess sufficient strength to attack the escorting carriers. This attack proved that, when they succeeded in establishing contact, the submarines were fully efficient. The best results could, therefore, be expected as soon as the new submarines should be in service. There were, moreover, reasons for wondering if the squadrons of torpedo-bombers could not be more effectively employed in the north than in the Mediterranean.

Hitler in complete agreement with Doenitz, requested Goering to consider this transfer.

The Invasion

The experiences of the landings in Sicily and Italy had convinced Hitler and Doenitz that the Allies would require a port on the Channel or the French west coast for effecting a landing in force, hence defenses had been concentrated accordingly.

The enormous *Mulberry* preparations had escaped the notice of the German intelligence services; the points chosen in Normandy for the landing of the first elements caught the command unawares.

On 12 June, Hitler called his immediate collaborators to his headquarters. After discussing the situation with them, he gave them his directives.

He considered the situation as being very grave, but still had some hope that the Allies would attempt a second landing in order to have a port, and this one could be repelled. The Saint-Vaast region appeared most probable to him or, perhaps, Dieppe and Boulogne. He ordered intensive mining of the Seine estuary in both sea and air operations, and concentration of the 45,000 naval forces which constituted the units that were available in case of emergency.

Hitler, together with Jodl, was of the

opinion that if this second landing did not take place, their only chance lay in blocking the Allies in the then existing bridgeheads. If the Allies succeeded in regaining their mobility, their enormous superiority in vehicles and fuel would insure them victory, and evacuation of France as far as the Maginot line would have to be expected. Would they be able to hold on this line? Keitel believed they would. Jodl was less positive. All hoped that the bomb attacks on London by the V-1s, which were to begin that same evening, would confuse enemy aviation and force the Allied command to undertake a second landing without delay.

At the conclusion of the conference, Doenitz drew up a few general directives which may be summarized as follows:

1. It is too soon to sacrifice, in favor of emergency measures, long-range plans which are in a fair way to being realized.
2. We must, on the contrary, make use of all local forces available, or in the immediate vicinity, for the battle in the Channel, including the training groups, which it will be necessary to divide into two parts.

3. Salvage the submarines of the anti-invasion group of the Bay of Biscay and make ready for all submarines to fall back to Norway.

Hitler again called in the Grand Admiral from 29 June to 1 July for a general discussion of the situation. The stubborn resistance of his troops had restored his confidence and he repeated and elaborated on his general directives of 12 June; unrelenting attack of Allied communications in the air and on the seas; mines, torpedoes (especially circling torpedoes in the channels already dragged), soaring bombs, and small attack units. He ordered the transformation of pursuit aircraft to fighter-bombers, especially in the case of the jet-propelled fighters which were ready for delivery and which, alone, were able to operate with success in spite of the Allied superiority.

Naval Measures

Doenitz gave a report of the measures taken with his very scanty forces: Twelve E-boats in the Seine estuary, a single torpedo boat whose repairs were about completed, eight "Schnorkel" submarines. He announced the impending arrival of six new E-boats, of fourteen "Schnorkel" submarines, of a few "Neger" (one-man submarines) and launches loaded with explosives. But he counted especially on the intensive planting of thousands of DM-1 mines with a double firing device, magnetic and pressure-operated.

Hitler warmly approved these measures and recalled the Allied efforts at the time of the Norway invasion: Their salvation lay in harassment of the enemy's lines of communication. To protect the German lines, he ordered the organization on the ground of channels through which convoys would travel under the protection of antiaircraft guns and fighter patrols.

Doenitz announced, finally, his intention of undertaking a strong diversionary attack on the Atlantic convoys.

In another conference which was held on 10 July, Doenitz conferred with the commanders in chief of the northeastern theaters. He called attention to the seriousness of the situation that would result from a Russian breakthrough to the Baltic, not only from the naval point of view but also from the point of view of army supply. He also pointed to the fact that all the naval formations which were trained in ground combat were employed at that moment, and that he lacked matériel for equipping others.

In a conversation with Hitler later, Doenitz gave a report of the performances of the long-range torpedo G-7, employed in the Seine estuary. This torpedo, launched from an E-boat or a submarine, travelled to a given point from whence it was able to continue its journey over a predetermined route.

Doenitz remained at the headquarters until 13 July and was asked several times by Keitel to furnish naval rifle troops for filling in the increasingly large gaps in the various theaters. Hitler himself expressed his confidence in these troops and his desire to see their numbers increased. Doenitz promised to furnish 10,000 men on condition that they would be provided with the necessary cadres and equipment.

Hitler finally expressed his confidence in the new jet-propelled plane, the *Me 262*, which was to come into use in a week's time. He counted on the surprise effect that would be caused by the technical superiority of this plane. His intention was to keep the invention secret for four months in order to accumulate sufficient reserves, after which the air situation might be entirely reversed.

The Attempt on Hitler's Life

A few days later, Hitler was the object of an attempted assassination in his headquarters at Rastenburg.

Doenitz, who had been called to Rastenburg immediately following the attempt, immediately issued a proclamation, characterizing the act as one committed by "former, irresponsible officers" and, in the Navy, at least, everything immediately returned to normal. Hitler's wounds, and the moral shock resulting from this occurrence, were doubtless the cause of the suspension of the monthly conferences. They were not resumed until 13 October, after the total liberation of France and the disappearance of the last hopes for a German victory. Defeat was, from then on, inevitable. The optimistic expectations relative to the new submarines had not been fulfilled. Of the 290 submarines under construction, only sixty-five were finished. The total number of submarines in service had fallen from 180 to 140. The new types, XXI and XXIII, had not yet been tested and could not be employed before January 1945. In spite of Speer's efforts

to protect German shipyards and ports, the priority given aeronautical construction stood in the way of the construction of shelters and the new units were in danger of being destroyed before they were launched.

During the few conferences held toward the end of the year, outside of problems resulting from air attacks, only those connected with evacuations were presented to Doenitz for solution, such as: The retreat of the German forces from Norway and Kurland, and delaying action to be taken on Lake Balaton and on the Danube.

In the midst of these dramatic pre-occupations, one notes anxieties which shed an unexpected light on the still-confident state of mind of the German naval chief. We are surprised to find the announcement of the sending to Japan of a mission of fifteen naval officers, "in order to learn there the conditions characterizing great, modern naval operations," with a view to the future reorganization of the German fleet! (3 December 1944). We likewise find expression of Doenitz' uneasiness about "keeping the enemy under an impression of security" at the time of the first sorties of the new-type submarines, in order not to provoke premature countermeasures on his part. The Grand Admiral still looked forward to success in his submarine warfare and tenaciously prepared a last effort to encircle the British Isles with submarines capable of existing under water.

Conclusions

What conclusions should we draw from the naval viewpoint of this first year of the German defeat? First, there was the general ineffectiveness of the "anti-invasion" measures.

The *Schnorkel* submarines, the mines and the small attack units, did cause some worry to the Allies, and, from the technical viewpoint, the Germans gave proof of extraordinary ingenuity. They did not succeed, however, in the Channel or at Anzio, in stopping the landing operations.

In the second place, the organization of the coast defense was constantly interfered with as the result of dual command. The subordination of naval elements to military authorities produced only disappointments. In those instances where naval command over mixed forces was required, the results were less serious.

Finally, the lack of naval aviation. Recriminations by Doenitz against the *Luftwaffe* constantly recurred: Too few planes; poorly trained personnel; absence of necessary liaison; etc.

The effort made by Doenitz remained fruitless, but one should bear in mind the almost desperate conditions under which they were undertaken. He was thwarted in his efforts by a total lack of understanding of naval problems on the part of the German High Command and Hitler's associates.

The basic concepts of warfare change but little throughout the centuries. The weapons alone change from generation to generation, from war to war. As long as men must travel over, on, or under the ocean areas of the globe, ships will be necessary. As long as men derive their livelihood from the sea and transoceanic commerce, ships are essential. And as long as those ships exist, and the lifelines of commerce are utilized, navies must also exist to protect them and ensure them safe use of those lifelines and free access to their terminals.

Secretary of the Navy John L. Sullivan

Moore

